

**BIRLA INSTITUTE OF TECHNOLOGY
MESRA, RANCHI**



MINUTES

**104th ACADEMIC COUNCIL MEETING OF THE
INSTITUTE**

Held on 6th November 2020 (Friday)
at 3.00 P.M Virtual mode through Video Conferencing

PLACE: CONFERENCE HALL
BIRLA INSTITUTE OF TECHNOLOGY
MESRA, RANCHI - 835 215



BIRLA INSTITUTE OF TECHNOLOGY

(Deemed University u/s 3 of UGC Act 1956)
Mesra, Ranchi- 835215

MINUTES

FOR

MEETING OF THE 104th ACADEMIC COUNCIL

Date: 6th November 2020

Time: 3.00 P.M. Virtual mode through Video Conferencing

104.01. 104th Academic Council Meeting was held on 6th November 2020 at 3.00 P.M. Virtual mode through Video Conferencing. The meeting was chaired by the Vice Chancellor. The list of members who attended the meeting is enclosed as Annexure – A.

104.02. Confirmation

Minutes of the 102nd Special Meeting of the Academic Council held on 28th February 2020 at 11.00 A.M. in the Institute Conference Hall and 103rd Special Meeting of the Academic Council held on 5th June 2020 at 11.00 A.M. in the Institute Conference Hall were confirmed.

104.03. Assessments & Adjustments Policy for Examinations (MO 2020) COVID-19

Based on the recommendations of Dean (Academic Programmes) followed by the approval of the Vice-Chancellor vide notice ref. no. Dean (AP)/2020-21/18 dated 09/09/2020, the Academic Council accorded its ratification for Assessments & Adjustments Policy for Examinations (MO 2020) COVID-19. *Annex.-I*

104.04 Department of Electronics & Communication Engineering

Proposal to start two new PG Programmes.

1. Microelectronics & Embedded Systems
2. Wireless Communication & RF Systems

The members of the Academic Council discussed the proposal of new PG programmes in detail and concluded that proposal will be discussed in another forum considering AICTE approved courses/nomenclature before the introduction of new programmes. *Annex.-II*

104.05 **Department of Chemical Engineering**

Proposal for closure of M.Tech Chemical Engineering Programme

The Departmental Academic Committee (DAC) in its meeting held on 15/10/2020 proposed to close M.Tech Chemical Engineering Programme. *Annex.-III*

Academic Council accorded its approval.

104.06 **Department of Architecture**

Change the name of the department to “Department of Architecture and Planning”

The Faculty members of the department of Architecture in its Departmental Meeting (DM) held on 06/8/2019, meeting of Departmental Policy Committee (DPC) held on 07/08/2019 and meeting of Board of Studies (BoS) held on 13/09/2019 proposed to change the name of the department to “Department of Architecture and Planning”.

Annexure-IV

Academic Council accorded its approval.

104.07 **Department of Civil & Environmental Engineering**

i) In-depth Specialization in Geotechnical Engineering

The HoD, proposed “In-depth Specialization in Geotechnical Engineering” for the B. Tech in Civil Engineering students. *Annexure-V*

Academic Council accorded its approval.

ii) In-depth Specialization in Structural Engineering

The HoD, proposed “In-depth Specialization in Structural Engineering” for the B. Tech in Civil Engineering students. *Annexure-VI*

Academic Council accorded its approval

iii) Minor Specialization in Environmental Science and Engineering

Academic Council suggested for further deliberation in another forum considering students demand and job potential before introduction of the proposed minor programme ‘Minor Specialization in Environmental Science and Engineering’ for B. Tech students of other UG engineering programme. *Annexure-VII*

iv) Minor in Civil Engineering.

The Academic Council recommended for further deliberation in another forum considering students demand and job potential before the introduction of the proposed minor programme. ‘Minor in Civil Engineering’ for B. Tech students of other UG engineering. *Annexure-VIII*

104.08 **Department of Mechanical Engineering**

The Departmental Academic Committee (DAC) in its meeting held on 21/08/2020 proposed to offer two subjects mentioned as under to accommodate the students of B. Tech (Production Engineering) willing to register in minor subjects offered by Department of Mechanical Engineering.

- i) ME 203 Fluid Mechanics & Hydraulics Machines / ME 353 Computational Fluid Mechanics
- ii) ME 205 Strength of Materials / ME 355 Advanced Solid Mechanics

Annexure- IX

Academic Council accorded its approval.

104.09 **Department of Computer Science & Engineering**

The Board of Studies (BoS) of the Department of Computer Science & Engineering in its meeting held on 22/09/2020 proposed as under:

- i) Renaming of courses of BCA
- ii) Approval of Syllabus for 2 years MCA programme

Annexure- X

Academic Council accorded its approval

104.10 Ph.D. Viva Voce

The Academic Council considered the recommendations of the respective viva-voce Boards of the following Ph.D. scholars and approved for the award of Ph.D. Degree to them provisionally.

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
1	Rajeev Kant Ph.D/PE/10053/2013	Production Engineering	Dr. L.N. Pattanaik	Dr.Vijay Pandey	Design and Performance Evaluation of Cellular Manufacturing System in Lean Environment	Engineering
2	Rohit Singh Ph.D/PH/10052/2013	Pharm. Sc & Technology	Dr.(Mrs.)Swastika Ganguly		Design, Synthesis and Studies on Some Newer N-Substituted Azoles	Pharmaceutical Sciences & Technology
3	Joyani Das Ph.D/PH/10001/2015	Pharm. Sc & Technology	Dr.(Mrs.)Papiya Mitra Mazumder		Investigation of Role of some Flavonoids in Diabetes Induced Macrovascular Complications Using Murine and Chick Embryo Models	Pharmaceutical Sciences & Technology
4	Naresh Panigrahi Ph.D/66/2010	Pharm. Sc & Technology	Dr.(Ms.) Swastika Ganguly	Dr.Jagadeesh Panda(Ext.)	Synthesis and Study of Some Novel Oxazolidinone Analogs	Pharmaceutical Sciences & Technology
5	Manish Soni Ph.D/AM/1053/2010	Physics	Dr. Swagata Payra	Dr. Sunita Verma	Numerical modeling of air quality over North-West India	Science
6	Ms. Gargi Akhoury Ph.D/AM/1004/2011	Physics	Dr. Kirti Avishek	Dr. Ashwini Ranade (Ext.)	Global automospheric changes and its effect on weather across India	Science
7	Debdutta Chattopadhyay Ph.D/MB/1053/2011	Management	Dr. Meenakshi Sharma		A Study of Energy Mix for Sustainable Development of Power Sector in India	Management
8	Mr. Nitu Borgohain Ph.D/AP/10004/2012	Physics	Dr. S. Konar		Nonlinear optical pulse and beam propagation in quantum well nanostructures	Science
9	Vikash Kumar Ph.D/EC/10001/2013	ECE	Dr. Aminul Islam		Design of Some Circuits for RF Applications	Engineering
10	Vishnu Kumar Saxena Ph.D/CS/10006/2012	Computer Sc. & Engineering	Dr. S. Pushkar		Enhancing Models and Alogrithms in Privacy Preserving Data Mining	Engineering

11	Ms. Pooja Jha Ph.D/MB/10007/2012	Management	Dr. Munish Makkad	Prof. Sanjeev Mittal(Ext.)	Factors affecting the Performance of Indian Women Entrepreneurs	Management
12	Ms. Tesnim Arfi Ph.D/BT/10006/2012	Bio Engineering	Dr. V.K. Nigam		Microbial production of a thermostable 3-cyanopyridinase for synthesis of nicotinic acid	Science
13	Mrs. Dipti Kumari Ph.D/CS/10004/2012	Computer Sc. & Engineering	Dr. K. Rajnish		Development of Software fault prediction models using object oriented Design measurement	Engineering
14	Prabhash Chandra Mishra Ph.D/95/2009	Management	Dr. S. Shivani	Dr. Satyendra Kishore (Ext.)	Information Technology as an Enabler for Knowledge Management: A study of Indian Coal Mining Industry	Management
15	Mrs. Swarima Tewari Ph.D/AM/1003/2011	Mathematics	Prof. Soubhik Chakraborty		Some Studies in Computational Musicology in Hindustani Music	Technology
16	Mr. Jagesh Kumar Ranjan Ph.D/CHP/10001/2013	Chemical Engineering	Dr. G. Goswami	Dr. Raghuraja Pandiyan K (Ext.)	Development of Biocomposites based on Interpenetrating Polymer Networks	Technology
17	Mr. Abhishek Pandey Ph.D/CS/1004/2011	Computer Sc. & Engineering	Dr. Soumya Banerjee		Assessment of Quality of test case: An evolutionary algorithm based approach	Engineering
18	Mr. Chekuri Ashok Kr. Varma Ph.D/PH/10002/2016	Pharm. Sc & Technology	Dr. K. Jayaram Kumar		Exploring Soluble Polysaccharides from Seeds of Peltophorum pterocarpum (DC.) K. Heyne, And Alizia lebbeck (L.) Benth. As Parmaceutical excipients	Pharmaceutical Sciences & Technology
19	Mrs. Mahuya Deb Ph.D/AM/10002/2012	Mathematics	Dr. Prabjot kaur		A study on the Intuitionistic Fuzzy Opmptimization Approach to Inventory models	Science
20	Mr. Santosh Kumar Pattanayak Ph.D/MB/10001/2013	Management	Dr. Supriyo Roy		Synergizing Business Process management with Enterprise Resource Planning for Supply Chain Performance	Management
21	Mr. Gauri Shanker Gupta Ph.D/EE/1053/2010	EEE	Prof. R.K. Sinha	Dr. S. Ghosh (Ext.)	Control of Electrical Devices using EEG Signals for Brain-computer Interface	Engineering

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
22	Mrs. Pratibha Jha Ph.D/IT/10001/2013	Computer Sc. & Engineering	Dr. Bhaskar Karn		Knowledge Based Supply chain Practices: A Study on Indian Digital Selling Companies.	Science
23	Mr. Kamal Kant Ph.D/PH/10051/2012	Pharm. Sc & Technology	Dr. Manik	Dr. Uma Ranjan Lal	Phytochemical and Biological Investigations on <i>Arisaema tortuosum</i> (Wall.) Schott - Folklore of Western Himalayan Region	Pharmaceutical Sciences & Technology
24	Mrs. Sushma Kamlu Ph.D/EE/10003/2012	EEE	Dr.(Mrs.)Vijaya Laxmi		Implementation of Maintenance Scheduling for Vehilces based on Geographical Information System	Engineering
25	Mrs. Richa N.K. Sharma Ph.D/41/2005	Remote Sensing	Dr. A.K. Singh		Analysis of Forest-cover change and its drivers in mine-induced landscapes of Chotanagpur Plateau using Remote Sensing and Geographic information system	Science
26	Mr. Rupesh Kumar Sinha Ph.D/EC/1005/2011	ECE	Dr. Sitanshu Sekhar Sahu		Chaos-based Symmetric Cryptography for Image Security	Engineering
27	Mr. Dhruv Jha Ph.D/PH/10053/2014	Pharm. Sc & Technology	Dr.(Mrs.) Papiya Mitra Mazumder		Pharmacological Evaluations of <i>Madhuca longifolia</i> (J. Koenig ex. L.) in Obesity Linked Type 2 diabetes	Pharmaceutical Sciences & Technology
28	Ms. Summi Dutta Ph.D/BT/10002/2014	Bio Engineering	Dr. K. Mukhopadhyay	Dr. Manish Kumar	Study of leaf rust responsive transacting small interfering RNAs and microRNAs in wheat (<i>Triticum aestivum</i> L.)	Science
29	Mr. Rakesh Patra Ph.D/CS/10051/2011	Computer Sc. & Engineering	Dr. S.K. Saha		Machine lerning methods for efficient information extraction	Engineering
30	Ms. Neha Gupta Ph.D/MB/10012/2012	Management	Dr. Vandna Sharma		A Study of Impact of Human resource Practices On Employee Engagement In Mass Rapid Transit System organizations In India	Management

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
31	Ratnesh Gautam Ph.D/CE/10051/2013	Civil & Environmental Engineering	Prof. Anand Kr. Sinha		Forecasting of Evapotranspiration using Time Series Modelling	Engineering
32	Ms. Sarita Kumari Ph.D/EE/10004/2012	EEE	Dr.(Mrs.) Sarbani Chakraborty		Investigation on Magneto-optic Materials for Spectral Filtering and Magnetic Field Sensing	Engineering
33	Mr. Dharendra Prabhakar Ph.D/BT/10004/2012	Bio Engineering	Dr. Dinesh Prasad		Detection of Heavy Metals in Environmental Samples through Porous Silicon Based Nanosensor	Science
34	Mrs. Madhwi Kumari Ph.D/02/2010	EEE	Dr. P.R. Thakura	Dr. D.N. Badokar (Ext.)	Dynamic Analysis of Voltage Source Inverter Fed Induction Motor Driven Hybrid Electric Vehicle	Engineering
35	Mr. Amit Kumar Ph.D/IT/10055/2013	Computer Sc. & Engineering	Dr. B.K. Sarkar		Designing Efficient Hybrid Classification Systems	Engineering
36	Mr. Sumantra Misra Ph.D/AR/10002/2012	Architecture	Dr. Manjari Chakraborty		Determination of Architectural Style in Post independent India	Architecture
37	Mr. Saptarshi Mondal Ph.D/RS/10052/2013	Remote Sensing	Dr. C. Jeganathan		Multi-Scale Mapping of Agriculture in the Complex Mountain Ecosystem of Western-Himalya Using Time-Series Remote Sensing Data	Science
38	Mr. Amudala Prathap Ph.D/ESE/10001/2012	Civil & Environmental Engineering	Dr. Sukalyan Chakraborty		Environmental Consequences and Reclamation Options of Charhi and Kuju Coal Mining Areas, Jharkhand, India	Engineering
39	Ms. Monalipa Dash Ph.D/AR/10001/2014	Architecture	Dr. Manjari Chakraborty		Impact of urban fabric on microclimate, redefining building development regulation on climate context	Architecture
40	Mr. Kailash Chandra Panday Ph.D/77/2009	Management	Dr. Manju Bhagat		Role of HR in Execution of Turnkey Projects	Management

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
41	Mrs. Prabha S. Pardeshi Ph.D/33/2010	Management	Dr. P.C. Jha		Factors Affecting the Emotional Intelligence and Life Skills of Teachers and Students in Indian Schools.	Management
42	Ms. Farhana Rozy Ph.D/AC/10053/2013	Chemistry	Dr. A. Sharon		Diversity Oriented Synthesis From Pyranone Analogs as Possible Antiviral Agents	Science
43	Shweta Ph.D/AM/1054/2011	Physics	Dr. A.P. Krishna	Dr. B.K. Bhattacharya (Ext.)	Long-term regional evapotranspiration dynamics over Indian vegetation system using space-borne observations	Technology
44	Ms. Noopur Khare Ph.D/BT/10005/2014	Bio Engineering	Dr. Sheela Chandra		Chemosensitization of Breast Cancer Cell Lines using Natural bioactive Compounds	Technology
45	Ms. Rashmi Gupta Ph.D/BT/10001/2014	Bio Engineering	Dr. P. Padmanabhan		Biosynthesis of Gold Nanoparticles and its Application in Drug Delivery	Technology
46	Md. Danish Ph.D/AR/10001/2012	Architecture	Dr. Manjari Chakraborty	Dr. S.K. Pandey (Ext.)	Assessing the Economic Suitability of UNESCO World Heritage Sites - a case of Red Fort Complex, New Delhi.	Architecture
47	Mr. Trideba Padhi Ph.D/EC/10052/2014	ECE	Dr. Mahesh Chandra		Development of adaptive models for active control of ascotic noise	Engineering
48	Mr. Mayank Singh Ph.D/EE/1051/2010	EEE	Dr. R.C. Jha		Impact Assessment of Demand Side Management	Engineering
49	Ms. Amrita Kumari Ph.D/AC/07/2010	Chemistry	P.K. Srivastava		Experimental Investigation and mathematical modeling of corrosion-erosion damage mechanisms in Coal Fired Power Plant Components	Science
50	Mrs. Reetika Sehgal Ph.D/MB/10051/2014	Management	Dr. Ashish Mohan Dubey		Development of Best Practice Framework for Implementing Public Private Partnership in Infrastructure in India	Management

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
51	Ms. Sweta Kumari Ph.D/EC/1010/2011	ECE	Dr. Sitanshu Sekhar Sahu		Design and Implementation of Controller for Energy Harvesting Applications	Engineering
52	Mrs. Priyanka Srivastava Ph.D/CS/1054/2010	Computer Sc. & Engineering	Dr. K.S. Patnaik		Investigation of NEAR System in terms of Image Resemblance	Technology
53	Mr. Diganta Munshi Ph.D/MB/10002/2012	Management	Dr. Sraboni Dutta		Corporate Sustainability- An Evolving Corporate Management Paradigm in Indian Manufacturing Firms	Management
54	Mr. Dhawaleswar Rao CH Ph.D/CS/10056/2016	Computer Sc. & Engineering	Dr. S.K. Saha		Automatic question generation, answer evaluation and learning platform design for school level education.	Engineering
55	Mr. Pranjal Kumar Ph.D/MB/10004/2012	Management	Dr. Ashutosh Mishra		A study of Impact of Tourism Sector on socio-economic development of Jharkhand	Management
56	Mr. Pravin Kumar Ph.D/CE/1055/2010	Civil & Environmental Engineering	---		Economic analysis of road projects under public private partnership for prioritization and funding options	M.Phil in Engineering
57	Mr. Ajay Kumar Verma Ph.D/77/2005	Mathematics	Prof. N.C. Mahanti	Dr. Rakesh Verma (Ext.)	A Fuzzy Approach to Multicriteria Facility Location Problem.	Science
58	Mrs. Siba Mitra Ph.D/CS/1011/2011	Computer Sc. & Engineering	Dr. K. Mukherjee	Dr.(Mrs.) Ajanta Das (Ext.)	On Fault Management in Wireless Sensor Network	Technology
59	Mr. Sachin Ramesh Khedekar Ph.D/EC/1008/2011	ECE	Dr. Mainak Mukhopadhyay		Development of a New Direction of Arrival (DOA) Estimation Algorithm for Smart Antenna and its Implementation on FPGA Platform	Engineering
60	Mrs. Rajendrani Mukherjee Ph.D/CS/10051/2016	Computer Sc. & Engineering	Dr. K.S. Patnaik		Investigation of Software Test Case Prioritization Techniques	Engineering

S.No	Name/ Roll No.	Department	Guide	Co-Guide	Title	Degree to be awarded in
61	Mr. Praveen Kumar Ph.D/RS/10054/2013	Remote Sensing	Dr. A.P. Krishna		FOREST BIOMASS MAPPING USING MULTI FREQUENCY AND MULTIPOLARIZATION SAR DATA COUPLED WITH OPTICAL DATA	Technology
62	Mr. Amar Kumar Kathwas Ph.D/RS/1001/2011	Remote Sensing	Dr. N. Patel		SPATIO-TEMPORAL ASSESSMENT OF SOIL EROSION IN PARTS OF SUBARNAREKHA WATERSHED, INDIA THROUGH GEOSPATIAL APPROACH	Science
63	Mr. Parikshit Vasisht Ph.D/EC/10003/12	ECE	Dr. Neela Chatteraj		Some Investigations on Dielectric Resonator Antennas	Engineering
64	Mr. Sumanta Bhattacharyya Ph.D/EC/10056/2013	ECE	Dr. Manoj Kr. Mukul		Real-Time EEG Signal Processing for Movement Imagery Classification	Engineering
65	Mr. Sumit Srivastava Ph.D/IT/10005/2012	Computer Sc. & Engineering	Dr. G. Sahoo (retired on 31.01.20)	Dr. Mahesh Chandra (left the Institute)	Speaker Identification & Its Applications Using Voice & Audio Watermarking	Engineering
66	Mrs. Anju Chourasia Ph.D/AM/10003/2013	Mathematics	Dr. Prakash Chandra Srivastava	Dr. Yogesh Gupta (Ext.)	Numerical Simulation and Applications for Boundary Value Problems	Science
67	Ms. Rati Kumari Sinha Ph.D/BT/1051/2011	Bio Engineering	Dr. H.R. Singh		Structural and Kinetic Characterization of recombinant L-Asparaginase from <i>Pseudomonas fluorescens</i>	Science
68	Ms. Kriti Akansha Ph.D/BT/10007/2013	Bio Engineering	Dr. S. Ghosh Sachan	Dr. Debashis Chakraborty (Ext.)	Process development for decolourization and degradation of azo dyes by microorganisms	Science
69	Mr. Santosh Kumar Ph.D/MB/10018/2012	Management	Dr. Roopali Sharma		A Study of the Performance of Indian Stock Exchanges during the Period of Recent Global Financial Crisis	Management

104.11 Reconstitution of Board of Studies (BoS)

The Academic Council approved the BoS of the various departments mentioned as under in principle and further suggested that HoDs/Directors off-campus to have more members from industries.

1. Department / Off-Campus: Production Engineering		
Existing Committee		
Internal Members		
Sl. no	Name	Designation
1.	HOD/In-Charge	Chairman(Ex-Officio)
2.	Dr. Vinay Sharma	Professor
3.	Dr. Bijay Kumar Singh	Professor
4.	Dr. S. C. Srivastava	Associate Professor
5.	Dr. Joyjeet Ghose	Associate Professor
6.	Dr. Arbind Kumar-1	Professor, Mechanical
7.	Dr. Gautam Sarkhel	Associate Professor, Chemical Engg.
8.	One faculty from BIT off campus, Patna	Assistant Professor Production Engineering, BIT Patna Off Campus
9.	One faculty from BIT off campus, Deoghar	Assistant Professor Production Engineering, BIT Deoghar Off Campus
10.	One representative, UG	Final year having good academic record and no backlog
11	One representative, PG	Final year having good academic record and no backlog
External Members		
Members from Academic Institute		
Sl. No	Name	Designation
1.	Dr. Somnath Chattopadhyaya	Associate Professor, Department of Mechanical Engineering, Indian School of Mines, Dhanbad – 826004
2.	Dr. D. Banerjee	Associate Professor, Dept. of Production Engg., Jadavpur University, Kolkata-32
3.	Dr. Nirjhar Roy	Professor, Department of Mechanical Engineering, MNIT, Allahabad
4.	Dr. Niranjan Kumar Singh	Professor, Dept. of Forge Technology, NIFFT, Hatia, Ranchi

Members from Industry		
1.	Mr. Shree Ranjan	Program manager TATA Technologies, Jamshedpur
2.	Mr. Rana S Chakraborty	DGM, Mecon Ltd., Ranchi
3.	Mr. Nitin Kumar	Dy. Manager, Maruti Suzuki India Ltd.
Proposed Committee		
Internal Members		
Sl. no	Name	Designation
1.	HOD/In-Charge	Chairman (Ex-Officio)
2.	Dr. S.K Jha	Associate Professor
3.	Dr. Ritesh Kumar Singh	Associate Professor
4.	Dr. L. N. Pattanaik	Associate Professor
5.	Dr. Somak Datta	Assistant Professor
6.	Dr. Dipti Prasad Mishra	Professor Mechanical Engg.
7.	Dr. Utpal Baul	Professor, Department of Management
8.	One faculty member from BIT off campus, Patna	Professor/Associate professor/Assistant Professor Production Engineering, BIT Off Campus, Patna
9.	One faculty member from BIT off campus, Deoghar	Professor/Associate professor/Assistant Professor Production Engineering, BIT Off Campus, Deoghar
10.	One representative, UG	Final year having good academic record and no backlog
11.	One representative, PG	Final year having good academic record and no backlog
External Members		
Members from Academic Institute		
Sl. No	Name	Designation
1.	Dr. Govind Sharan Dangayach	Professor & Head Department of Mechanical Engineering, Malaviya National Institute of Technology, J I Nehru Marg, Jaipur - 302017 Mobile: +91-9950344500 Email: dangayach@gmail.com
2.	Dr. Saroj Kumar Patel	Professor, Department of Mechanical Engineering, National Institute of Technology Rourkela, Odisha, India - 769008 Mobile: +91 9437484951 E-mail: skpatel@nitrkl.ac.in
3.	Dr. Ghanshyam Das	Head, Dept. of metallurgy and materials, NIFFT, Hatia, Ranchi Phone: 0651-2292076, 91-7352060676(M) Email: drgdas.nifft@gov.in; gsdnifft@gmail.com

Members from Industry		
1.	Mr. Rohit Saboo (Alumni of Prod. Department)	President and CEO National Engineering Industries Limited, Jaipur - 302006 Mobile: +91-1412222335 Email: rsaboo@nbcbearings.in
2.	Mr. Prabhakar Kadapa	CEO, AVTEC Limited, Delhi. Email: prabhakar.kadapa@avtec.in
3.	Mr. Rajneesh Kumar (Alumni of Prod. Department)	Chief Manager (E&M) CMPDIL, Coal India Limited, Ranchi - 834031 Mobile: +91-9431102543 Email: rajneesh.kumar@coalindia.in
4.	Mr. P. Pathak	DGM, Rolling Technology, R&D SAIL, Ranchi Mobile: 08986880223 Email: ppathak@sail-rdcis.com
5.	Mr. Vishwajit Kumar	Senior Manager, Iron Making Division, MECON Ltd, Doranda, Ranchi-834002 Mobile: 09431186722 Email: vishwajit@mecon.co.in

2. Department / Off-Campus: Civil and Environmental Engineering			
Existing Committee			
Internal Member			
Sl. No.	Name of Member	Designation	
1.	Head of the Department, Civil and Environmental Engineering	Chairman (Ex-Officio)	
2.	Dr. Sudeshna Chakravarty, Professor	Member	
3.	Dr. (Mrs.) Bindhu Lal, Professor	Member	
4.	Dr. Birendra Kr. Singh, Professor	Member	
5.	Dr. Indrajit Roy, Asso. Professor	Member	
6.	Dr. Kirti Avishek, Assistant Professor	Member	
7.	Dr. D.J. Biswas, Professor (Architecture)	Member	
8.	Dr. C. Jeganathan, Professor (Remote Sensing)	Member	
External Member			
Sl. No.	Name of Member, Designation, Institute/Company, Full Address		
1.	Dr. S.K. Maity, Professor, (ESE) ISM Dhanbad	Member	
2.	Dr. Rajesh Kumar, Professor, (CE) IIT BHU	Member	
3.	Dr. Rakesh Pratap Singh, Asso. Professor, (CE) NIT Jamshedpur	Member	
4.	Mr. Sujib Chatterjee, Chief Manager (Civil), CMPDIL, Ranchi	Member	
5.	Dr. Rammohan Chatterjee, Head (Structural Div), CET, SAIL, Ranchi	Member	
6.	Mr. Suvendu Basu, Head, Redimix, Health & Safety, Lafarge, Kolkata	Member	
Proposed Committee (Board of Studies)			
Internal Member			
Sl. No.	Name	Designation	Reason of change
1	Head of the Department, Civil and Environmental Engineering	Chairman (Ex-Officio)	
2	Dr. Anand Kr. Sinha, Professor	Member	
3	Dr. (Mrs.) Bindhu Lal, Professor	Member	
4	Dr. Birendra Kr. Singh, Professor	Member	

5	Dr. Indrajit Roy, Asso. Professor	Member	
6	Dr. Kirti Avishek, Assistant Professor	Member	
7	Dr. D.J. Biswas, Professor (Architecture)	Member	
8.	Dr. C. Jeganathan, Professor (Remote Sensing)	Member	
External Member			
Sl. No.	Name of Member, Designation, Institute/Company, Full Address		
1.	Dr. S.K. Maity, Professor, (ESE) ISM Dhanbad	Member	
2.	Dr. Rajesh Kumar, Professor, (CE) IIT BHU	Member	
3.	Dr. Rakesh Pratap Singh, Asso. Professor, (CE) NIT Jamshedpur	Member	
4.	Mr. Sujib Chatterjee, Chief Manager (Civil), CMPDIL, Ranchi	Member	
5.	Dr. Rammohan Chatterjee, Head (Structural Div), CET, SAIL, Ranchi	Member	
6.	Mr. Suvendu Basu, Head, Redimix, Health & Safety, Lafarge, Kolkata	Member	
Members from Off-campus, BIT, Patna, where the same UG courses are being offered			
7.	Prof. (Dr.) Balram Singh, HOD, Patna Centre, BIT	Invited Member	
8.	Prof. (Dr.) Rajeev Ranjan Sahay, Patna Centre, BIT	Invited Member	
Students' Representatives			
9.	Miss. Mansi Jha (BE/10686/17)	Student Representative	
10.	Mr. Sharique Khan (BE/10295/17)	Student Representative	

3. Department/ Centre: Management, BIT, Mesra, Ranchi		
Existing Committee		
Internal Member:		
Sl.No.	Name of Members	Designation
1.	HOD/ In-charge	Chairman (Ex-Officio)
2.	Dr. Manju Bhagat, Professor, Dept. of Management, BIT, Mesra	Member
3.	Dr. Utpal Baul, Professor, Dept. of Management, BIT, Mesra	Member
4.	Dr. S.K. Bose, Professor, Dept. of Management, BIT, Mesra	Member
5.	Dr. S. Shivani, Professor, Dept. of Management, BIT, Mesra	Member
6.	Dr. R.N. Bhagat, Professor, Dept. of Management, BIT, Mesra	Member
7.	Dr. Supriyo Roy, Associate Professor, Dept. of Management, BIT, Mesra	Member
8.	Dr. Amitabh Verma, Assistant Professor, Dept. of Management, BIT, Mesra	Member
Members from Allied Department:		
1.	Dr. R. N. Gupta, Professor, Dept. of Pharmaceutical Sciences, BIT, Mesra	Member
2.	Dr. G. Sahoo, Professor, Dept. of Computer Science & Engg. BIT, Mesra	Member
External Member:		
Members from Academics : (Any One)		
Sl.No.	Name of Member, Designation, Institute/ Company, Full Address	
1.	Prof. Partha Pratim Sengupta, Sr. Professor, Humanities & Social Sciences NIT- Durgapur , West Bengal Mobile No. 9434788045, E Mail: pps42003@yahoo.com	Member
2.	Dr. Tannushri Dutta, Faculty, IIM, Ranchi Mobile No. 9939135277, Email: tanusree@iimranchi.ac.in	Member
3	Dr. Gourav Manohar Marathe, Faculty, IIM, Ranchi, Mobile No. 9006902118, Email: gaurav.m@iimranchi.ac.in	Member

Members from Industry: (Any One)		
1.	Mr. Priyobrata Bhattacharjee, DGM (Knowledge Management), Birla Corporation Ltd. Birla Cement Works (A MP Birla Group) Durgapur , West Bengal, Mobile: 8170054418/9233313650 Email: priyabrata72@gmail.com	Member
2.	Dr. P. K. Chatterjee, GM , MECON Ranchi, Mobile: 9470193070 Email: ckpradep61@yahoo.co.uk	Member
Proposed Committee		
Internal Member:		
SI.No.	Name of Members	Designation
1.	HOD/ In-charge	Chairman (Ex-Officio)
2.	Dr. Utpal Baul, Professor, Dept. of Management, BIT, Mesra	Member
3.	Dr. Manju Bhagat, Professor, Dept. of Management, BIT, Mesra	Member
4.	Dr. S. Shivani, Professor, Dept. of Management, BIT, Mesra	Member
5.	Dr. R.N. Bhagat, Professor, Dept. of Management, BIT, Mesra	Member
6.	Dr. Sraboni Dutta, Associate Professor, Dept. of Management, BIT, Mesra	Member
7.	Dr. Supriyo Roy, Associate Professor, Dept. of Management, BIT, Mesra	Member
8.	Dr. Rohini Jha, Assistant Professor, Dept. of Management, BIT, Mesra	Member
Members from Allied Department:		
1.	Dr. Vandana Bhattacharjee, Prof. & Head, Dept. of Computer Science and Engineering, BIT, Mesra	Member
2.	Dr. Ritesh Kumar Singh, Associate Professor, Dept. of Production Engineering, BIT, Mesra	Member
External Member:		
Members from Academics : (Any One)		
SI.No.	Name of Member, Designation, Institute/ Company, Full Address	
1.	Dr. Tannushri Dutta, Faculty, IIM, Ranchi Mobile No. 9939135277 Email: tanusree@iimranchi.ac.in	Member
2.	Dr. Rakesh Kumar Singh, Professor, IMT Ghaziabad Mobile: 9953596501 Email: rksingh@imt.edu	Member
3.	Prof. Partha Pratim Sengupta, Sr. Professor, Humanities & Social Sciences NIT- Durgapur , West Bengal Mobile No. 9434788045 E Mail: pps42003@yahoo.com	Member
Members from Industry: (Any One)		
1.	Dr. Shivesh Singh, Head Business HR, Bandhan Bank Mobile: 9999002032 Email: shivesh.singh@bandhanbank.com	Member
2.	Dr. P. K. Chatterjee, GM , MECON Ranchi, Mobile: 9470193070 Email: ckpradep61@yahoo.co.uk	Member
3.	Mr. Shiva Botchu, Associate Director, Deloitte Consulting New Delhi Mobile: 9899773347 Email: shivabotchu@gmail.com	Member

4. Department/ Centre : Computer Science & Engineering		
Existing Committee		
Internal Member		
Sl. No.	Name of Member	Designation
1	HOD/In-Charge	Chairman (Ex-Officio)
2	Dr. G. Sahoo	Professor, CSE
3	Dr. V. Bhattacharjee	Professor & Head, CSE
4	Dr. S. Dutta	Professor, CSE
5	Dr. K. Rajnish	Associate Professor, CSE
6	Dr. A. Mustafi	Associate Professor, CSE
7	Dr. B. K. Sarkar	Assistant Professor, CSE
8	Dr. I. Mukherjee	Assistant Professor, CSE
9	Dr. S.Pal	Professor & Head, ECE
10	Dr. C. Jeganathan	Professor & Head, DRS

External Member	
Sl. No.	Name of Member, Designation, Institute/Company, Full Address
1	Prof. R. Mall, Professor, IIT Khargapur, A-72, IIT Campus, Kharagpur 721302.
2	Dr. P.K. Reddy, Professor , IIIT Hrderabad, Gachibowli Hyderabad, Telangana state, India , Pin: 500032, INDIA
3	Dr. B. Majhi, Director& Registrar of IIITDM Kancheepuram Mentor director of IIITD Kurnool, Vandalur- Kelambakkam Road Chennai: 600127
4	Dr. Chiranjeev Kumar , Assoc. Professor, IIT_ ISM Dhanbad Thakur colony , BekarBandh, Dhanbad- 826001, Jharkand, India Tel:+ 91-326-2203784
5	Mr. Rajiv Kaul, CEO, CMS Infosystems
6	Prof. R. Mall, Professor, IIT Khargapur, A-72, IIT Campus, Kharagpur 721302.

Proposed Committee			
Internal Member			
Sl. No.	Name	Designation	Reason for change
1	HOD/In-Charge	Chairman (Ex-Officio)	The previous committee had completed its two year term.
2	Dr. V. Bhattacharjee (HOD)	Professor & Head, CSE	
3	Dr. S. Dutta,	Professor, CSE	
4	Dr. K. S. Patnaik,	Associate Professor, CSE	The inclusion of Nominees from Off campuses is as per suggestion of Academic Council members.
5	Dr. Sujan Kumar Saha,	Associate Professor, CSE	
6	Dr. S. Pushkar,	Assistant Professor, CSE	
7	Dr. Shamama Anwar,	Assistant Professor, CSE	
8	Faculty Member CSE, Nominee of Director BIT Jaipur		
9	Faculty Member CSE, Nominee of Director BIT Patna		
10	Faculty Member CSE, Nominee of Director BIT Deoghar		
11	Faculty Member CSE, Nominee of Director BIT Noida		
12	Faculty Member CSE, Nominee of Director BIT Lalpur		
13.	Student Representative (B.Tech/M.Tech/MCA)		

External Member	
Sl. No.	Name of Member, Designation, Institute/Company, Full Address
1	Mr. Amitabh Bhattacharjee GM IT Division, Mecon (External Member) Ranchi
2	Dr. Annapa B, Professor, NITK Surathkal (External Member)
3	Dr. Asif Ekbal, Associate Professor, IIT Patna (External Member)
4	Mr. Suparana kanti Das Scientist E DRDO, Kolkata (External Member)
5	Mr. D.S. Verma, JAPIT (External Member) Ranchi
6.	Dr. Ujjwal Maulik, Professor, CSE Jadavpur University (External Member)
7.	Dr. Punam Bedi , Professor, University of Delhi (External Member) Delhi

104.12. University Polytechnic

Director-University Polytechnic proposed for change of branch as under from the academic session 2020-21 which was already approved by the competent authority of the institute and Extension of Approval by AICTE vide letter F.No. Eastern/1-7012635824/2020/EOA dated 15-Jun-2020.

1. Manufacturing Engineering to Mechanical Engineering Production
2. Electronics Engineering to Electronics and Communication Engineering

Annexure -XI

Academic Council accorded its ratification.

104.13. Department of Bio-Engineering

Proposal for closure of two PG Programmes

The Departmental Academic Committee (DAC) and Departmental Policy Committee in its meeting held on 05/11/2020 proposed to close **two PG Programmes as under.**

1. M.Tech (Biomedical Instrumentation)
2. M.Sc. (Bioinformatics)

Annexure: -XII

Academic Council accorded its approved.

104.14. Department of Space Engineering & Rocketry

Board of Studies (BoS), Department of Space Engineering & Rocketry proposed in its meeting held on 06/01/2020 to review the existing courses and introduce two new courses as under.

1. SR510 – Fundamentals of Aerospace Engineering
2. SR511 – Fundamentals of Fuels and Combustion

Annexure: -XIII

Academic Council accorded its approved.

104.15. Addendum to the Assessments & Adjustments Policy for Examinations (MO 2020) COVID-19

Based on the recommendations of Dean (Academic Programmes) followed by the approval of the Vice-Chancellor vide notice ref. no. Dean (AP)/2020-21/18 dated 09/09/2020, the Academic Council accorded its ratification to the addendum for Assessments & Adjustments Policy for Examinations (MO 2020) COVID-19.

Annexure: -XIV


104.16 BITEC -Noida

Reconstitution of Doctoral Committee of Ms. Ratna Gupta, Roll No PHD / MB/ 10059/ 2012

Academic Council did not approve the proposal of appointing Dr. Arun Mittal as Internal guide for Ms. Ratna Gupta as the research area of Dr. Arun Mittal does not match with the research area of the scholar.

104.17. Reporting Items

- | | | |
|--|---|------------------|
| 1. Registration, formation of Doctoral Committee | : | [58 candidates] |
| 2. Pre-Ph.D. Qualifying Papers | : | [65 candidates] |
| 3. Ph.D. Research Topics | : | [10 candidates] |
| 4. Change / Modification in the Ph. D. Thesis / Title | : | [12 candidates] |
| 5. Reconstitution of Doctoral Committee | : | [83 candidates] |
| 6. Addition / Change of Guide | : | [26 candidates] |
| 7. De-Registration from the Ph.D. Programme | : | [11 candidates] |
| 8. Permission for extension for pursuing Ph.D. programme | : | [68 candidates] |
| 9. Transfer from Full Time to Part Time | : | [03 candidates] |
| 10. Transfer of Ph.D. scholars BIT (Mesra to Patna & Deoghar): | : | [02 candidates] |
| 11. Re-structuring of Departmental Academic Committee / (DAC) / Off-Campus Academic Committee (OAC)/ (CSE, Production Engg., BITEC-Noida & BITEC-Deoghar Remote Sensing) | : | [05 Departments] |


(A.P. Krishna)
Registrar & Secretary
Academic Council

Dated: 17/12/2020

1. LIST OF STUDENTS REGISTERED IN SP 20 FOR PHD PROGRAMME & THEIR DOCTORAL COMMITTEE

Sl. No.	Name	Roll No.	Department /Centre
1.	Anuradha Mahanty	Ph.D./AC/10051/2019	Chemistry
2.	Uttam Kumar Mishra	Ph.D./AC/10052/2019	Chemistry
3.	Sweta Kumari	Ph.D./AM/10051/2019	Mathematics
4.	Naincy Kumari	Ph.D./AP/10051/2019	Physics
5.	Ashutosh Kumar	Ph.D./AP/10052/2019	Physics
6.	Manu Priya Darshani	Ph.D./AP/10053/2019	Physics
7.	Debidatta Behera	Ph.D./AP/10054/2019	Physics
8.	Bhavna Sharma	Ph.D./BE/10051/2019	Bio Engg.
9.	Anchita Prasad	Ph.D./BE/10052/2019	Bio Engg.
10.	Sunanda	Ph.D./BE/10053/2019	Bio Engg.
11.	Madhubala Kumari	Ph.D./BE/10054/2019	Bio Engg.
12.	Usha Lakra	Ph.D./BE/10055/2019	Bio Engg.
13.	Pulkit Srivastava	Ph.D./BE/10056/2019	Bio Engg.
14.	Sharmili Roy	Ph.D./BE/10057/2019	Bio Engg.
15.	Aruna Rani	Ph.D./BE/10058/2019	Bio Engg.
16.	Nishi Prakash Tiwari	Ph.D./BE/10059/2019	Bio Engg.
17.	Soumya Pandey	Ph.D./CEE/10051/2019	CEE
18.	Shalini Priya	Ph.D./CEE/10052/2019	CEE
19.	Bijendra Sahoo	Ph.D./CHE/10051/2019	Chemical Engg.
20.	Akanksha Kumari	Ph.D./CHE/10052/2019	Chemical Engg.
21.	Siddharth Saraswati	Ph.D./CHE/10053/2019	Chemical Engg.
22.	Adla Sanober	Ph.D./CS/10001/2019	CSE
23.	Shubhojeet Paul	Ph.D./CS/10002/2019	CSE
24.	Mansi Gupta	Ph.D./CS/10003/2019	CSE
25.	Tannisha Kundu	Ph.D./CS/10005/2019	CSE
26.	Shruti Gedam	Ph.D./CS/10051/2019	CSE
27.	Priyanka Kumari	Ph.D./CS/10052/2019	CSE
28.	Abhinash Jenasamanta	Ph.D./CS/10053/2019	CSE
29.	Animesh Kumar	Ph.D./CS/10054/2019	CSE
30.	Suparna Das	Ph.D./CS/10055/2019	CSE
31.	Rishabh Deo Pandey	Ph.D./CS/10056/2019	CSE
32.	Ankita Kumari	Ph.D./CS/10057/2019	CSE
33.	Chanchala Kumari	Ph.D./EC/ 10051/2019	ECE
34.	Monalisa Pandey	Ph.D./EC/ 10052/2019	ECE
35.	Ayyagari Sai Lalitha	Ph.D./EE/ 10051/2019	EEE
36.	Shubham Kashyap	Ph.D./EE/ 10052/2019	EEE
37.	Shashank Shekhar	Ph.D./EE/ 10053/2019	EEE
38.	Abdullah Umar	Ph.D./EE/ 10054/2019	EEE
39.	Mayuri Srivastava	Ph.D./MB/10051/2019	Management
40.	Aveek Basu	Ph.D./MB/10007/2014	Management
41.	Md Modassir Khan	Ph.D./ME/10051/2019	Mechanical

42.	Mushtaque Momin	Ph.D./ME/10052/2019	Mechanical
43.	Dharmendra Kumar	Ph.D./ME/10053/2019	Mechanical
44.	Satyanand Pandey	Ph.D./ME/10054/2019	Mechanical
45.	Nigam Jyoti Maiti	Ph.D./PH/ 10051/2019	Pharmacy
46.	Sweta Kar	Ph.D./PH/ 10052/2019	Pharmacy
47.	Shreya Sharma	Ph.D./PH/ 10053/2019	Pharmacy
48.	Pankaj Dagur	Ph.D./PH/ 10054/2019	Pharmacy
49.	Satyajit Mohanty	Ph.D./PH/ 10055/2019	Pharmacy
50.	Swadesh Kr. Pattanik	Ph.D./PH/ 10056/2019	Pharmacy
51.	Pradip Jana	Ph.D./PH/ 10057/2019	Pharmacy
52.	Priyanka Chandra	Ph.D./PH/ 10058/2019	Pharmacy
48.	Rashmi Rani Minj	Ph.D./RS/10051/2019	Remote Sensing
49.	Kiran Choudhary	Ph.D./RS/10052/2019	Remote Sensing
50.	Animesh Gope	Ph.D./RS/10053/2019	Remote Sensing
51.	Akash Roy	Ph.D./RS/10054/2019	Remote Sensing
52.	Sunita Soren	Ph.D./RS/10055/2019	Remote Sensing
53.	Amit Abhishek	Ph.D./EC/10053/2019	BITEC, Patna
54.	Ankur Utsav	Ph.D./EC/10054/2018 (SP 19)	BITEC, Patna
55.	Zeba Zeya	Ph.D./EC/10054/2019	BITEC, Patna
56.	Vikas	Ph.D./CS/10058/2019	BITEC, Noida
57.	Annu Mishra	Ph.D./CS/10059/2019	BITEC, Noida
58.	Shilpa Singh	Ph.D./MB/10052/2019	BITEC, Noida

2. LIST OF STUDENTS FOR PRE-Ph.D. QUALIFYING PAPERS (COURSE WORK)

Sl. No.	Name of Scholars	Roll No.	Department /Centre
1.	Anuradha Mahanty	Ph.D./AC/10051/2019	Chemistry
2.	Uttam Kumar Mishra	Ph.D./AC/10052/2019	Chemistry
3.	Sweta Kumari	Ph.D./AM/10051/2019	Mathematics
4.	Naincy Kumari	Ph.D./AP/10051/2019	Physics
5.	Ashutosh Kumar	Ph.D./AP/10052/2019	Physics
6.	Manu Priya Darshani	Ph.D./AP/10053/2019	Physics
7.	Debidatta Behera	Ph.D./AP/10054/2019	Physics
8.	Bhavna Sharma	Ph.D./BE/10051/2019	Bio Engg.
9.	Anchita Prasad	Ph.D./BE/10052/2019	Bio Engg.
10.	Sunanda	Ph.D./BE/10053/2019	Bio Engg.
11.	Madhubala Kumari	Ph.D./BE/10054/2019	Bio Engg.
12.	Usha Lakra	Ph.D./BE/10055/2019	Bio Engg.
13.	Pulkit Srivastava	Ph.D./BE/10056/2019	Bio Engg.
14.	Sharmili Roy	Ph.D./BE/10057/2019	Bio Engg.

15.	Aruna Rani	Ph.D./BE/10058/2019	Bio Engg.
16.	Nishi Prakash Tiwari	Ph.D./BE/10059/2019	Bio Engg.
17.	Soumya Pandey	Ph.D./CEE/10051/2019	CEE
18.	Shalini Priya	Ph.D./CEE/10052/2019	CEE
19.	Bijendra Sahoo	Ph.D./CHE/10051/2019	Chemical
20.	Akanksha Kumari	Ph.D./CHE/10052/2019	Chemical
21.	Siddharth Saraswati	Ph.D./CHE/10053/2019	Chemical
22.	Adla Sanober	Ph.D./CS/10001/2019	CSE
23.	Shubhojeet Paul	Ph.D./CS/10002/2019	CSE
24.	Mansi Gupta	Ph.D./CS/10003/2019	CSE
25.	Tannisha Kundu	Ph.D./CSE/10005/2019	CSE
26.	Shruti Gedam	Ph.D./CS/10051/2019	CSE
27.	Priyanka Kumari	Ph.D./CS/10052/2019	CSE
28.	Abhinash Jenasamanta	Ph.D./CS/10053/2019	CSE
29.	Animesh Kumar	Ph.D./CS/10054/2019	CSE
30.	Suparna Das	Ph.D./CS/10055/2019	CSE
31.	Rishabh Deo Pandey	Ph.D./CS/10056/2019	CSE
32.	Ankita Kumari	Ph.D./CS/10057/2019	CSE
33.	Chanchala Kumari	Ph.D./EC/ 10051/2019	ECE
34.	Monalisa Pandey	Ph.D./EC/ 10052/2019	ECE
35.	Ayyagari Sai Lalitha	Ph.D./EE/ 10051/2019	EEE
36.	Shubham Kashyap	Ph.D./EE/ 10052/2019	EEE
37.	Shashank Shekhar	Ph.D./EE/ 10053/2019	EEE
38.	Abdullah Umar	Ph.D./EE/ 10054/2019	EEE
39.	Mayuri Srivastava	Ph.D./MB/10051/2019	Management
40.	Aveek Basu	Ph.D./MB/10007/2014	Management
41.	Md Modassir Khan	Ph.D./ME/10051/2019	Mechanical
42.	Mushtaque Momin	Ph.D./ME/10052/2019	Mechanical
43.	Dharmendra Kumar	Ph.D./ME/10053/2019	Mechanical
44.	Satyanand Pandey	Ph.D./ME/10054/2019	Mechanical
45.	Nigam Jyoti Maiti	Ph.D./PH/ 10051/2019	Pharmacy
46.	Sweta Kar	Ph.D./PH/ 10052/2019	Pharmacy
47.	Shreya Sharma	Ph.D./PH/ 10053/2019	Pharmacy
48.	Pankaj Dagur	Ph.D./PH/ 10054/2019	Pharmacy
49.	Satyajit Mohanty	Ph.D./PH/ 10055/2019	Pharmacy
50.	Swadesh Kumar Pattanik	Ph.D./PH/ 10056/2019	Pharmacy

51.	Pradip Jana	Ph.D./PH/ 10057/2019	Pharmacy
52.	Priyanka Chandra	Ph.D./PH/ 10058/2019	Pharmacy
53.	Rashmi Rani Minj	Ph.D./RS/10051/2019	Remote Sensing
54.	Kiran Choudhary	Ph.D./RS/10052/2019	Remote Sensing
55.	Animesh Gope	Ph.D./RS/10053/2019	Remote Sensing
56.	Akash Roy	Ph.D./RS/10054/2019	Remote Sensing
57.	Sunita Soren	Ph.D./RS/10055/2019	Remote Sensing
58.	Amit Abhishek	Ph.D./EC/10053/2019	BITEC, Patna
59.	Ankur Utsav	Ph.D./EC/10054/2018	BITEC, Patna
60.	Zeba Zeya	Ph.D./EC/10054/2019	BITEC, Patna
61.	Vikas	Ph.D./CS/10058/2019	BITEC, Noida
62.	Annu Mishra	Ph.D./CS/10059/2019	BITEC, Noida
63.	Shilpa Singh	Ph.D./MB/10052/2019	BITEC, Noida
64.	Rachna Kumari	Ph.D/EC/1007/2011	ECE/BITD
65.	Sitakanta Maharatha	Ph.D/EC/1009/2011	ECE/BITD

3. PH.D. RESEARCH TOPIC

Sl. No.	Name of Scholars	Roll No.	Research Topics	Department /Centre
1.	RAVISHASTRI	Ph.D./ME/10055/2017	Performance Analysis of cyclone Separators with different Geometrics	Mechanical
2.	M. HEMA SREE	Ph.D./PH/10054/2018	“Comparative evaluation of different polymer-drug hydrazone conjugates for achieving specific tumor-targeted delivery application”	Pharmaceutical Science & Tech.
3.	AMRITA CHATTERJEE	Ph.D./PH/10001/2019	“Therapeutic targeting of Nrf2-ARE pathway by phytopharmaceuticals derived from Krishna Tulsi (red forma of Ocimum tenuiflorum Linn.) during oxidative stress”	Pharmaceutical Science & Tech.
4.	KABERI CHATTERJEE	Ph.D./PH/10002/2019	Study of Vitamin K2 in Learning and Memory in Murine Models	Pharmaceutical Science & Tech.
5.	RAJDEEP SAHA	Ph.D./PH/10003/2019	Studies on the effects of bioactive molecules from <i>Clerodendrum glandulosum</i> Lindl. in diabetic wound healing	Pharmaceutical Science & Tech.

6.	PRIYADARSHI APARAJAY	Ph.D./PH/10005/2019	Development of Folate Targeted Niosomal Drug Delivery System for Cancer	Pharmaceutical Science & Tech.
7.	RAVI PRATAP SINGH	Ph.D./PH/10007/2019	Investigation of Anti-obesity and antihyperlipidemic activity of Bio-active fractions of some selected natural plants on different obese animal models	Pharmaceutical Science & Tech.
8.	MANSI AGRAWAL	Ph.D./PH/10008/2019	Studies on Anti Asthmatic Properties of Active Fraction of <i>Manilkara Zapota</i> Leaves in the Treatment of Chemical Induced Asthma	Pharmaceutical Science & Tech.
9.	ADITYA DEV RAJORA	Ph.D./PH/10009/2019	Fabrication and Evaluation of Green Nanofiber Mat Using Different Techniques for Pharmaceutical and Biomedical Applications	Pharmaceutical Science & Tech.
10.	MAHENDRA PRATAP SWAIN	Ph.D./PH/10010/2019	Fabrication and Evaluation of Cyclodextrin Based Nano Carrier Systems of Some Hydrophobic Drugs	Pharmaceutical Science & Tech.

4. CHANGE/MODIFICATION IN THE PH.D. THESIS TITLE

Sl. No.	Name of the Scholars & Roll No.	Existing Titled	Proposed Titled	Reason / Remarks	Deptt. /Centre
1.	Shalini Mahato Ph.D./CS/10052/2016	Electroencephalogram (EEG) Analysis for Detection of Depression using Soft Computing and Data Mining Techniques	Machine Learning based EEG Signal Analysis for Detection of Major Depressive Disorder	Doctoral Committee in its meeting on Pre-Ph.D. thesis submission seminar proposed for minor corrections in the thesis.	CSE
2.	Manish Kumar Ph.D./ME/10003/2017	Experimental and Numerical Analysis of Submerged Entry Nozzle and Mould in Continuous Slab Casting	Experimental and Analysis of Submerged Entry Nozzle and Mould in continuous slab casting	As Decided by the D.C.	Mechanical Engg.

3.	Saumya Shalu Ph.D./AC/10001/2016	Synthesis, characterization and applications of perovskite ceramics and their polymer composites	Synthesis and Dielectric study of Barium Strontium Titanate Based 0-3 Polystyrene Composites	This research work focuses on B.Sc. based ceramics for use as reinforcing filler in polystyrene matrix. Accordingly, the title has been modified.	Chemistry
4.	Chandra Bhushan Kumar Ph.D./ME/10051/2015	Dual Fuel Diesel Engine with Hydrogen as a Fuel	Investigations on the Performance of Dual Fuel Diesel Engine by Addition of Di-tert Butyl Peroxide and Hydrogen as a Secondary Fuel	As per progress in research work, paper published and communicated paper in Elsevier (international Journal of Hydrogen Energy)	Mechanical Engg.
5.	Aveek Basu Ph.D./MB/10007/2014	A Framework for ERP based on Cloud Computing	Cloud ERP framework in Indian SMES: Analysis of Acceptance, Selection & Application	For better clarity and focus	Management
6.	Sarat Kumar Mishra Ph.D./EE/10051/2012	Application of Evolutionary Computing Techniques to Multiobjective Problems in Power System	Application of Evolutionary Algorithms to Multiobjective Problems in Power System	The changes are minute keeping the goal and purposes intact.	Electrical & Electronics Engg.
7.	Amit Kumar Sahoo Ph.D./EE/10003/2014	Development of Soft and Evolutionary based Algorithm to Direct and Inverse Modeling Problem	Development of Computational Intelligence based Algorithms for Control and Identification of Maglev System	The changes are minute keeping the goal and purposes intact.	Electrical & Electronics Engg.
8.	Deep Shekhar Acharya Ph.D./EE/10052/2013	Analytical Study on Stability and Sensitivity Limitations of Multi Agent Systems.	Development of Multi Agent Evolutionary Algorithm based Fractional Order PID Controller for Magnetic Levitation Plant	The changes are minute keeping the goal and purposes intact.	Electrical & Electronics Engg.

9.	Wasim Akram Sheikh Ph.D./CEE/10001/2015	Removal & Degradation of toxic industrial dye using novel nano biocomposite	Removal & degradation of toxic industrial dye using biochar based Nano composite	More appropriate as per the review comments of candidate's publications	Civil & Environmental Engg.
10.	Sunaina Kothari Ph.D./MB/10061/2013	To Study the Impact of Sensory cues on Multi sensory Brand Experience	To Study the Impact of sensory Marketing on Brand loyalty and consumer's Purchase intention in case of Quick Restaurant Industry.	D.C. found the revised title satisfactory and recommended to chance	BITEC-Noida
11.	Gautam Mahapatra Ph.D./CS/1060/2011	Dr. Soumya Banerjee (Guide) Dr. Ranjan Chattaraj, BIT Mesra (Co-Guide)	Dr. Ranjan Chattaraj, BIT Mesra (Guide) Dr. Soumya Banerjee (External Guide)	As Dr. Soumya Banerjee (Guide) left the institute.	BITEC-Deoghar
12.	Mukesh Kumar Ph.D./MB/10016/2012	Dr.(Mrs.) Ritu Arora (Guide)	Dr. (Mrs.) Roopali Sharma (Guide) Dr. (Mrs.) Ritu Arora (Co-Guide)	Earned Leaves for 85 days (8.7.2019 to 30.11.2019) and then extraordinary leave of one year (1.12.2019 to 3.9.2020) taken by the Guide of the Scholar Dr. Ritu Arora, Assistant Professor, Management Dept. for going abroad for personal reason. The Leave of Dr. Ritu Arora was duly sanctioned by the competent Authority	BITEC, Jaipur

5. **RECONSTITUTION OF DOCTORAL COMMITTEE**

1. Department / Off-Campus: Physics						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Rolly Verma Ph.D./AP/10051/2017	HOD, Physics (Ex-Office)	Chairman	HOD, Physics (Ex-Office)	Chairman	Dr. Sudip Kundu has resigned from the Institute
		Dr. S.K. Rout	Guide & Member	Dr. S.K. Rout	Guide & Member	
		Dr. Madhu Priya	Member	Dr. Madhu Priya	Member	
		Dr. D.K. Singh	Member	Dr. D.K. Singh	Member	
		Dr. Sudip Kundu (ECE)	Member	Dr. Sitanshu Sekhar Sahu (ECE)	Member	
		Dr. subhendu Naskar (Chemistry)	Member	Dr. subhendu Naskar (Chemistry)	Member	
2. Department / Off-Campus: Management						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Shelly Srivastava Ph.D./MB/10052/2012	HOD, Management (Ex-Office)	Chairman	HOD, Management (Ex-Office)	Chairman	Due to Superannuation of Dr. G. Sahoo
		Dr. Supriyo Roy	Member & Guide	Dr. Supriyo Roy	Member & Guide	
		Dr. R.N. Bhagat	Member	Dr. R.N. Bhagat	Member	
		Dr. (Mrs.) Shradha Shivani	Member	Dr. (Mrs.) Shradha Shivani	Member	
		Dr. G.Sahoo (CSE)	Member	Dr. G.Sahoo (CSE)	Member	
		Dr. Sanjay Kr. Jha (Production)	Member	Dr. Sanjay Kr. Jha (Production)	Member	

2.	Sunit Prasad Ph.D./MB/10052/2017	HOD, Management (Ex-Office)	Chairman	HOD, Management (Ex-Office)	Chairman	Due to superannuation of Dr. S.K. Bose & Dr. S.K. Chakraborty
		Dr. Rohini Jha	Guide & Member	Dr. Rohini Jha	Guide & Member	
		Dr. A.N. Jha	Member & Co-Guide	Dr. A.N. Jha	Member & Co-Guide	
		Dr. S.K. Bose	Member	Dr. Sarboni Dutta	Member	
		Dr. Supriyo Roy	Member	Dr. Supriyo Roy	Member	
		Dr. Ritesh Kr. Singh (Production)	Member	Dr. Ritesh Kr. Singh (Production)	Member	
		Dr. S.K. Chakraborty (Math)	Member	Dr. Prabjot Kaur (Math)	Member	
3.	Karan Pratap Ph.D./MB/10017/2017	HOD, Management (Ex-Office)	Chairman	HOD, Management (Ex-Office)	Chairman	Dr. S.C. Srivastava Left the Institute.
		Dr. P.C. Jha	Guide & Member	Dr. P.C. Jha	Guide & Member	
		Dr. S.K. Bose	Member	Dr. Sarboni Dutta	Member	
		Dr. V.S. Rathore (RS)	Member	Dr. R.N. Bhagat	Member	
		Dr. S.C. Srivastava (Production)	Member	Dr. V.S. Rathore (RS)	Member	
				Dr. Praveen Mishra (Mechanical)	Member	

3. Department / Off-Campus: CEE						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Shilpi Sippi Bhuinyan Ph.D./CEE/10055/2017	HOD, CEE (Ex-Office)	Chairman	HOD, CEE (Ex-Office)	Chairman	Dr. Koushik Paul has resigned from the Institute
		Dr. Anand Kr. Sinha	Guide & Member	Dr. Anand Kr. Sinha	Guide & Member	
		Dr. Birendra Kr. Singh	Member	Dr. Birendra Kr. Singh	Member	
		Dr. Koushik Paul	Member	Dr. R.Naresh Kumar	Member	
		Dr. Manjari Chakraborty (Archi- tecture)	Member	Dr. Manjari Chakraborty (Architecture)	Member	
		Dr. Dipti Prasad Mishra (Mechanical)	Member	Dr. Dipti Prasad Mishra (Mechanical)	Member	
2.	Aditya Kumar Jha Ph.D./CEE/10001/2018	HOD, CEE (Ex-Office)	Chairman	HOD, CEE (Ex-Office)	Chairman	Dr. Koushik Paul has resigned from the Institute
		Dr. Sukalyan Chakraborty	Guide & Member	Dr. Sukalyan Chakraborty	Guide & Member	
		Dr. Kirti Avishek	Member	Dr. Kirti Avishek	Member	
		Dr. Koushik Paul	Member	Dr. (Mrs.) Bindhu Lal	Member	
		Dr. Gautam Sarkhel (Chemical)	Member	Dr. Gautam Sarkhel (Chemical)	Member	
		Dr. Subhendu Naskar (Chemistry)	Member	Dr. Subhendu Naskar (Chemistry)	Member	

3.	Akash Mishra Ph.D./CEE/10052/2016	HOD, CEE (Ex-Office)	Chairman	HOD, CEE (Ex-Office)	Chairman	Dr. Koushik Paul has resigned from the Institute
		Bindhu Lal	Guide & Member	Bindhu Lal	Guide & Member	
		Dr. Tanushree Bhattacharya	Member	Dr. Tanushree Bhattacharya	Member	
		Dr. Koushik Paul	Member	Dr. Sukalyan Chakraborty	Member	
		Dr. D.M. Pandey (Bio Engg.)	Member	Dr. D.M. Pandey (Bio Engg.)	Member	
		Dr. Sumit Mishra (Chemistry)	Member	Dr. Sumit Mishra (Chemis- try)	Member	
4.	Kanchan Lakra Ph.D./CEE/10053/2018	HOD, CEE (Ex-Office)	Chairman	HOD, CEE (Ex-Office)	Chairman	Dr. Koushik Paul has resigned from the Institute
		Dr. Koushik Paul	Guide & Member	Dr. Kriti Avishek	Guide & Member	
		Dr. (Mrs.) Bindhu Lal	Member	Dr. (Mrs.) Bindhu Lal	Member	
		Dr. Sukalyan Chakraborty	Member	Dr. (Mrs.) Tanushree Bhattacharya	Member	
		Dr. Arup Chaudhury (Chemical)	Member	Dr. Manish Kumar (Bio Engg.)	Member	
		Dr. Pradip Kar (Chemistry)	Member	Dr. (Mrs.) Mili Ghosh (Remote Sensing)	Member	

4. Department / Off-Campus: ECE						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Vishal H. Shah Ph.D./EC/10009/2019	HOD, ECE	Chairman (Ex-Office)	HOD, ECE (EX officio Chairman)	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. Mahesh Chandra	Guide & Member	Dr. P.P.Dash	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. Kartik Mahto	Member	Dr. Kartik Mahto	Member	
		Dr. Sudhanshu Kr. Mishra (EEE)	Member	Dr. Randhir Singh (Maths)	Member	
		Dr. V.K. Jha (CSE)	Member	Dr. K.K.Senapati (CSE)	Member	
2.	Ashutosh Anand Ph.D./EC/10052/2015	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sudip Kundu has left the Institute
		Dr. Sudip Kundu	Guide & Member	Dr. Srikanta Pal	Guide & Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. Aminul Islam	Member	Dr. Aminul Islam	Member	
		Dr. Sujan Kumar Saha (CSE)	Member	Dr. Sujan Kumar Saha (CSE)	Member	
		Dr. Sarboni Chakraborty (Management)	Member	Dr. Sarboni Chakraborty (Management)	Member	

3.	Geetanjali Singh Ph.D./EC/10003/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sudip Kundu has left the Institute
		Dr. Sudip Kundu	Guide & Member	Dr. Sudip Kundu	Guide & Member	
		Dr. Aminul Islam	Member	Dr. Aminul Islam	Member	
		Dr. R.K. Lal	Member	Dr. R.K. Lal	Member	
		Dr. Sujan Kumar Saha (CSE)	Member	Dr. Sujan Kumar Saha (CSE)	Member	
		Dr. Sarboni Chakraborty (Management)	Member	Dr. Sarboni Chakraborty (Management)	Member	
4.	Monalisa Pandey Ph.D./EC/10052/2019	HOD, ECE	Chairman (Ex-Office)	HOD,ECE	Chairman (Ex-Office)	Dr. Aminul Islam has been allotted as the Guide by the Institute. Accordingly, title of the thesis is changed to “Design of Radiation Hardened Semiconductor Memory”. The DAC also recommended the new DC members based on the area of research work
		Dr. Manoj Kr. Mukul	Guide & Member	Dr. Aminul Islam	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr.S.S.Sahu	Member	Dr. Vijay Nath	Member	
		Dr. Sudhanshu Kr. Mishra (EEE)	Member	Dr. S.K. Sinha (Physics)	Member	
		Dr. Soubhik Chakraborty (Math)	Member	Dr. Sarbani Chakraborty (EEE)	Member	

5.	Arvind Kumar Ph.D./EC/10056/2016	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT & demised Dr. P.R. Thakura. The scholar has requested for Dr. S.S. Sonanki as his Guide. The DAC recommended Dr. Solanki as guide and Dr. Mahesh Chandra as External Guide as per institute rule and the D.C members decision on the on the area of research work
		Dr. Mahesh Chandra	Guide & Member	Dr. S.S. Solanki	Guide & Member	
		Dr. Kartik Mahto	Member	Dr. Mahesh Chandra	External Guide	
		Dr. S.S. Sahu	Member	Dr. Kartik Mahto	Member	
		Dr. R.P. Sharma (Mechanical)	Member	Dr. S.S. Sahu	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. V.K. Jha (CSE)	Member	
				Dr. T.Ghose (EEE)	Member	
6.	Sharmila Biswas Ph.D./EC/10006/2012	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. S.S. Solanki	Guide & Member	Dr. S.S. Solanki	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. Kartik Mahto	Member	
		Dr. Manoj Kr. Mukul	Member	Dr. Manoj Kr. Mukul	Member	
		Dr. Sridhar Patnaik (CSE)	Member	Dr. Sridhar Patnaik (CSE)	Member	
		Dr. Soubhik Chakraborty (Math)	Member	Dr. Soubhik Chakraborty (Math)	Member	

7.	Mukesh Kumar Ojha Ph.D./EC/1052/2011	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. Manoj Kr. Mukul	Guide & Member	Dr. Manoj Kr. Mukul	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. Vijay Nath	Member	
		Dr. S.S. Sahu	Member	Dr. S.S. Sahu	Member	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	
		Dr.D.K. Mallick (CSE)	Member	Dr.D.K. Mallick (CSE)	Member	
8.	Mukesh Kumar Choudhary Ph.D./EC/10052/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. S.S. Solanki	Guide & Member	Dr. S.S. Solanki	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. Kartik Mahto	Member	
		Dr. Manoj Kr. Mukul	Member	Dr. Manoj Kr. Mukul	Member	
		Dr. Soubhik Chakraborty (Math)	Member	Dr. Soubhik Chakraborty (Math)	Member	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	

9.	Deo Kumar Ph.D./EC/10055/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	
		Dr. Sanjeet Kumar	Guide & Member	Dr. Sanjeet Kumar	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. Sanjay Kumar	Member	Dr. Manoj Kr. Mukul	Member	
		Dr. Sudhanshu Kr. Mishra (EEE)	Member	Dr. Sudhanshu Kr. Mishra (EEE)	Member	
		Dr. Sudip Kumar Sahana (CSE)	Member	Dr. Sudip Kumar Sahana (CSE)	Member	
10.	Saurabh Sarkar Ph.D./EC/10060/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. S.S. Solanki	Guide & Member	Dr. S.S. Solanki	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. Kartik Mahto	Member	
		Dr. Manoj Kr. Mukul	Member	Dr. Manoj Kr. Mukul	Member	
		Dr. Soubhik Chakraborty (Math)	Member & Co-Guide	Dr. Soubhik Chakraborty (Math)	Member & Co-Guide	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	
		Dr. S.K. Saha (CSE)	Member	Dr. S.K. Saha (CSE)	Member	

11.	Sarah Asheer Ph.D./EC/10002/2014	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC Deoghar. DAC recommended the change for smooth conduction of scholar's research work
		Dr. Sanjeet Kumar	Guide & Member	Dr. Sanjeet Kumar	Guide & Member	
		Dr. Sanjay Kumar	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. S.S. Sahu	Member	Dr. S.S. Sahu	Member	
		Dr. A. Mustafi (CSE)	Member	Dr. A. Mustafi (CSE)	Member	
		Dr. Sudhansu Kr. Mishra (EEE)	Member	Dr. Sudhansu Kr. Mishra (EEE)	Member	
12.	Neha Rajak Ph.D./EC/10003/2014	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC Deoghar. DAC recommended the change for smooth conduction of scholar's research work
		Dr. Neela Chatteraj	Guide & Member	Dr. Neela Chatteraj	Guide & Member	
		Dr. Sanjay Kumar	Member	Dr. A.K. Tiwary	Member	
		Dr. D.K. Upadhyay	Member	Dr. D.K. Upadhyay	Member	
		Dr. S.Konar (Physics)	Member	Dr. S.Konar (Physics)	Member	
		Dr. (Mrs.) Anjana Pradhan Ghorai (Math)	Member	Dr. (Mrs.) Anjana Pradhan Ghorai (Math)	Member	

13.	Manish Mathew Tirkey Ph.D./EC/10001/2016	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. R.C. Jha has been transferred to BITEC Deoghar. DAC recommended the change for smooth conduction of scholar's research work
		Dr. (Mrs.) Nisha Gupta	Guide & Member	Dr. (Mrs.) Nisha Gupta	Guide & Member	
		Dr. Aminul Islam	Member	Dr. Aminul Islam	Member	
		Dr. S.S. Sahu	Member	Dr. S.S. Sahu	Member	
		Dr. S.K. Rout (Physics)	Member	Dr. S.K. Rout (Physics)	Member	
		Dr. R.C. Jha (EEE)	Member	Dr. Sudhansu Kr. Mishra (EEE)	Member	
14.	Rampravesh Kumar Ph.D./EC/10052/2016	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT & demise Dr. P.R. Thakura.
		Dr. Sanjay Kumar	Guide & Member	Dr. Sanjay Kumar	Guide & Member	
		Dr. Sanjeet Kumar	Member	Dr. Sanjeet Kumar	Member	
		Dr. Mahesh Chandra	Member	Dr. Manoj Kr. Mukul	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. T.Ghose (EEE)	Member	
		Dr. Rishi Sharma (Physics)	Member	Dr. Rishi Sharma (Physics)	Member	
15.	Sashi Shankar Ph.D./EC/10002/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar & demise Dr. P.R. Thakura
		Dr. Dileep Kumar Upadhyay	Guide & Member	Dr. Dileep Kumar Upadhyay	Guide & Member	

		Dr. Sanjay Kumar	Member	Dr. A.K. Tiwary	Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. Rishi Shamra (Physics)	Member	Dr. Rishi Shamra (Physics)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. T.Ghose (EEE)	Member	
16.	Uday Kumar Ph.D./EC/10006/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar & demised Dr. P.R. Thakura
		Dr. Dileep Kumar Upadhyay	Guide & Member	Dr. Dileep Kumar Upadhyay	Guide & Member	
		Dr. Sanjay Kumar	Member	Dr. A.K. Tiwary	Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. Rishi Shamra (Physics)	Member	Dr. Rishi Shamra (Physics)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. (Mrs.) Sarbani Chakraborty (EEE)	Member	
17.	Rashes Ranjan Ph.D./EC/10051/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar
		Dr. (Mrs.) Soumya Sidhishwari	Guide & Member	Dr. (Mrs.) Soumya Sidhishwari	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. R.K. Lal	Member	Dr. Vijay Nath	Member	
		Dr. (Mrs.) Sarbani Chakraborty (EEE)	Member	Dr. (Mrs.) Sarbani Chakraborty (EEE)	Member	

		Dr. Abhijit Mustafi (CSE)	Member	Dr. Abhijit Mustafi (CSE)	Member	
18.	Nishant Sharan Ph.D./EC/10052/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar
		Dr. S.K. Ghorai	Guide & Member	Dr. S.K. Ghorai	Guide & Member	
		Dr. Sanjay Kumar	Member	Dr. Sanjeet Kumar	Member	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. Abhijit Mustafi (CSE)	Member	Dr. Abhijit Mustafi (CSE)	Member	
		Dr. D.K. Mohanta (EEE)	Member	Dr. D.K. Mohanta (EEE)	Member	
19.	Ashish Raj Ph.D./EC/10053/2017	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sudip Kundu has left the Institute.
		Dr. (Mrs.) Nisha Gupta	Guide & Member	Dr. (Mrs.) Nisha Gupta	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. Sudip Kundu	Member	Dr. D.K. Updhyaya	Member	
		Dr. T.Ghose (EEE)	Member	Dr. T.Ghose (EEE)	Member	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	
20.	Rakesh Kumar Chandan Ph.D./EC/10002/2018	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. Srikanta Pal	Guide & Member	Dr. Srikanta Pal	Guide & Member	

		Dr. Mahesh Chandra	Member	Dr. S.S. Sahu	Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. Sanat Mukherjee (Physics)	Member	Dr. Sanat Mukherjee (Physics)	Member	
		Dr. Sudhansh Kr. Mishra (EEE)	Member	Dr. Sudhansh Kr. Mishra (EEE)	Member	
21.	Shashank Kr. Dubey Ph.D./EC/10003/2018	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT.
		Dr. Aminul Islam	Guide & Member	Dr. Aminul Islam	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. S.K. Ghorai	Member	
		Dr. Vijay Nath	Member	Dr. Vijay Nath	Member	
		Dr. Rishi Sharma (Physics)	Member	Dr. Rishi Sharma (Physics)	Member	
		Dr. Sudhanshu Kr. Mishra (EEE)	Member	Dr. Sudhanshu Kr. Mishra (EEE)	Member	
22.	Dyuti Mazumdar Ph.D./EC/10053/2015	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT
		Dr. Sanjay Kumar	Guide & Member	Dr. Sanjay Kumar	Guide & Member	
		Dr. Mahesh Chandra	Member	Dr. Sanjeet Kumar	Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. Abhijit Mustafi (CSE)	Member	Dr. Abhijit Mustafi (CSE)	Member	

		Dr. T.Ghose (EEE)	Member	Dr. T.Ghose (EEE)	Member	
23.	Saurabh Srivastava Ph.D./EC/10051/2018	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar
		Dr. (Mrs.) P.P. Dash	Guide & Member	Dr. (Mrs.) P.P. Dash	Guide & Member	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. Sanjay Kumar	Member	Dr. S.S. Sahu	Member	
		Dr. Abhinav Tandon (Math)	Member	Dr. Abhinav Tandon (Math)	Member	
		Dr. Subrajeet Moha- patra (CSE)	Member	Dr. Subrajeet Mohapatra (CSE)	Member	
24.	P.V.S. Murali Krishna Ph.D./EC/1051/2010	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Mahesh Chandra is not in service of BIT & demise Dr. P.R. Thakura
		Dr. R.K. Lal	Guide & Member	Dr. R.K. Lal	Guide & Member	
		Dr. Avireni Srini- vasulu	External Guide	Dr. Avireni Srinivasulu	External Guide	
		Dr. Mahesh Chandra	Member	Dr. Vijay Nath	Member	
		Dr. Animul Islam	Member	Dr. Animul Islam	Member	
		Dr. D.K. Mallick (CSE)	Member	Dr. D.K. Mallick (CSE)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. Rakesh Kr, Sinha (Bio Engg.)	Member	

25.	Md. Maqubool Hosain Ph.D./EC/10005/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Dr. Sanjay Kumar has been transferred to BITEC, Deoghar
		Dr. A.K. Tiwary	Guide & Member	Dr. A.K. Tiwary	Guide & Member	
		Dr. Sumana Kumari	Co- Guide & Member	Dr. Sumana Kumari	Co- Guide & Member	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. Sanjay Kumar	Member	Dr. D.K. Upadhaya	Member	
		Dr. Abhijit Mustafi (CSE)	Member	Dr. Abhijit Mustafi (CSE)	Member	
		Dr. S.K. Mishra (EEE)	Member	Dr. S.K. Mishra (EEE)	Member	
26.	Vishal Kumar Ph.D./EC/10009/2012	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. R.K. Lal	Guide & Member	Dr. R.K. Lal	Guide & Member	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. (Mrs.) Sarbani Chakraborty (EEE)	Member	
		Dr. S. Konar (Phys- ics)	Member	Dr. S. Konar (Physics)	Member	
27.	Atul Prakash Ph.D./EC/10053/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura

		Dr. R.K. Lal	Guide & Member	Dr. R.K. Lal	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. Aminul Islam	Member	Dr. Aminul Islam	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. S.K. Mishra (EEE)	Member	
		Dr. Abhijit Mustafi (CSE)	Member	Dr. Abhijit Mustafi (CSE)	Member	
28.	Madhu Kumar Ray Ph.D./EC/10057/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Vijay Nath	Guide & Member	Dr. Vijay Nath	Guide & Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. M.K. Mukul	Member	Dr. M.K. Mukul	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. S.K. Mishra (EEE)	Member	
		Dr. D.K. Mallick (CSE)	Member	Dr. D.K. Mallick (CSE)	Member	
29.	Abhishek Kumar Ph.D./EC/10054/2016	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Dileep Kumar Upadhyay	Guide & Member	Dr. Dileep Kumar Upadhyay	Guide & Member	
		Dr. Srikanta Pal	Member	Dr. Srikanta Pal	Member	
		Dr. Neel a Chatteraj	Member	Dr. Neel a Chatteraj	Member	

		Dr. P.R. Thakura (EEE)	Member	Dr.S.K. Mishra (EEE)	Member	
		Dr. Rishi Sharma (Physics)	Member	Dr. Rishi Sharma (Physics)	Member	
30.	Sneha Tiwari Ph.D./EC/10053/2018	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Srikanta Pal	Guide & Member	Dr. Srikanta Pal	Guide & Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. Neela Chatteraj	Member	Dr. Neela Chatteraj	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. T.Ghose (EEE)	Member	
		Dr. S.K. Rout (Physics)	Member	Dr. S.K.Rout (Physics)	Member	
31	Sravanth Kumar Ramkumari Ph.D./EC/10014/2012	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Mahesh Chandra	Guide & Member	Dr. Mahesh Chandra	Guide & Member	
		Dr. Bharat Gupta	External Guide	Dr. Bharat Gupta	External Guide	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. S.K. Ghorai	Member	Dr. S.K. Ghorai	Member	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. S.K. Sahana (CSE)	Member	

32.	Ramtanu Mukherjee Ph.D./EC/10010/2013	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. S.K. Ghorai	Guide & Member	Dr. S.K. Ghorai	Guide & Member	
		Dr. Bharat Gupta	External Guide	Dr. Bharat Gupta	External Guide	
		Dr. (Mrs.) Nisha Gupta	Member	Dr. (Mrs.) Nisha Gupta	Member	
		Dr. Somnath Gupta	Member	Dr. Somnath Gupta	Member	
		Dr. R.K. Sinha (Bio Engg.)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. (Mrs.) Sarbani Chakraborty (EEE)	Member	
33.	Deepak Prasad Ph.D./EC/10051/2015	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Vijay Nath	Guide & Member	Dr. Vijay Nath	Guide & Member	
		Dr. Aminul Islam	Member	Dr. Aminul Islam	Member	
		Dr. Sanjay Shankar Tripathy	Member	Dr. Sanjay Shankar Tripathy	Member	
		Dr. R.P. Sharma (Mechanical)	Member	Dr. R.P. Sharma (Mechani- cal)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. S.K. Sahana (CSE)	Member	

34	Pankaj Goel Ph.D./EC/10007/2012	HOD, ECE	Chairman (Ex-Office)	HOD, ECE	Chairman (Ex-Office)	Demise Dr. P.R. Thakura
		Dr. Mahesh Chandra	Guide & Member	Dr. Mahesh Chandra	Guide & Member	
		Dr. S.S. Solanki	Member	Dr. S.S. Solanki	Member	
		Dr. Vijay Nath	Member	Dr. Vijay Nath	Member	
		Dr. Sridhar Patnaik (CSE)	Member	Dr. Sridhar Patnaik (CSE)	Member	
		Dr. P.R. Thakura (EEE)	Member	Dr. R.K. Sinha (Bio Engg.)	Member	

5. Department / Off-Campus: Pharmaceutical Science & Technology						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Nisha Kumar Singh Ph.D./PH/10006/2019	HOD, Pharmacy	Chairman (Ex-Office)	HOD, Pharmacy	Chairman (Ex-Office)	Scholar wants to specifically work on Pharmaceutical Chemis- try based topic.
		Dr. Kishanta Kumar Pradhan	Guide & Member	Dr. (Ms.) Swastika Gangu- ly	Guide & Member	
		Dr. Ashok Kumar Pattnaik	Member	Dr. Ashok Kumar Pattnaik	Member	
		Dr. Manik Ghosh	Member	Dr. Manik Ghosh	Member	
		Dr. D.M. Pandey (Bio Engg.)	Member	Dr. D.M. Pandey (Bio Engg.)	Member	
		Dr. Sitanshu Sekhar Sahu (ECE)	Member	Dr. Sitanshu Sekhar Sahu (ECE)	Member	

6. Department / Off-Campus: Management						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Shelly Srivastava Ph.D./MB/10052/2012	HOD, Management	Chairman (Ex-Office)	HOD, Management	Chairman (Ex-Office)	Dr. G. Sahoo is superannuated from the services of BIT Mesra
		Dr. Supriyo Roy	Guide & Member	Dr. Supriyo Roy	Guide & Member	
		Dr. R.N. Bhagat	Member	Dr. R.N. Bhagat	Member	
		Dr. Shradha Shivani	Member	Dr. Shradha Shivani	Member	
		Dr. G. Sahoo (CSE)	Member	Dr. Kaushik Kumar (Mechanical)	Member	
		Dr. Sanjay Kr. Jha (Production)	Member	Dr. Sanjay Kr. Jha (Production)	Member	
2.	Sunit Prasad Ph.D./MB/10052/2017	HOD, Management	Chairman (Ex-Office)	HOD, Management	Chairman (Ex-Office)	Dr. S.K. Bose & Dr. S.K. Chakraborty are superannuated from the services of BIT Mesra
		Dr. (Mrs.) Rohini Jha	Guide & Member	Dr. (Mrs.) Rohini Jha	Guide & Member	
		Dr. A.N. Jha (BITEC, Lalpur)	Co-Guide	Dr. A.N. Jha (BITEC, Lalpur)	Co-Guide	
		Dr. S.K. Bose	Member	Dr. Sraboni Dutta	Member	
		Dr. Supriyo Roy	Member	Dr. Supriyo Roy	Member	
		Dr. Ritesh Kr. Singh (Production)	Member	Dr. Ritesh Kr. Singh (Production)	Member	
		Dr. S.K. Chakraborty (Math)	Member	Dr. Prajot Kaur (Math)	Member	

3.	Karan Pratap Ph.D/MB/10017/2017	HOD, Management	Chairman (Ex-Office)	HOD, Management	Chairman (Ex-Office)	
		Dr. Dr. P.C. Jha	Guide & Member	Dr. Dr. P.C. Jha	Guide & Member	
		Dr. (Mrs.) Sraboni Dutta	Member	Dr. (Mrs.) Sraboni Dutta	Member	
		Dr. S.C. Srivastava (Production)	Member	Dr. R.N. Bhagat	Member	
		Dr. Ritesh Kr. Singh (Production)	Member	Dr. V.S. Rathore (Remote sensing)		
			Member	Dr. Praveen Mishra (Me- chanical)		

7. Department / Off-Campus: Production Engg.						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Avinash Kumar Ph.D./PE/10052/2014	HOD, Production Engg.	Chairman (Ex- Office)	HOD, Production Engg.	Chairman (Ex-Office)	Dr. S.C. Srivastava left the Insti- tute BIT Mesra
		Dr. L.N. Pattanaik	Guide & Member	Dr. L.N. Pattanaik	Guide & Member	
		Dr. Rajiv Agrawal	Member & Co- Guide	Dr. Rajiv Agrawal	Member & Co-Guide	
		Dr. S.C. Srivastava	Member	Dr. Bappa Acherjee	Member	
		Dr. Somak Datta	Member	Dr. Somak Datta	Member	
		Dr. S. Sahana (CSE)	Member	Dr. S. Sahana (CSE)	Member	

		Dr. Prajot Kaur (Math)	Member	Dr. Prajot Kaur (Math)	Member	
2.	Ram Babu Verma Ph.D./PE/10052/2013	HOD, Production Engg.	Chairman (Ex-Office)	HOD, Production Engg.	Chairman (Ex-Office)	Dr. S.C. Srivastava left the Institute BIT Mesra
		Dr. Sanjay Kr. Jha	Guide & Member	Dr. Sanjay Kr. Jha	Guide & Member	
		Dr. S.C. Srivastava	Member	Dr. L.N. Pattnaik	Member	
		Dr. Somak Datta	Member	Dr. Somak Datta	Member	
		Dr. Gautam Sarkhel (Chemical)	Member	Dr. Gautam Sarkhel (Chemical)	Member	
		Dr. Prajot Kaur (Math)	Member	Dr. Prajot Kaur (Math)	Member	
3.	Hrishikesh Ph.D./PE/10051/2018	HOD, Production Engg.	Chairman (Ex-Office)	HOD, Production Engg.	Chairman (Ex-Office)	Dr. S.C. Srivastava left the Institute BIT Mesra
		Dr. L.N. Pattanaik	Guide & Member	Dr. L.N. Pattanaik	Guide & Member	
		Dr. S.C. Srivastava	Member	Dr. Bapaa Acherjee	Member	
		Dr. Sanjay Kr. Jha	Member	Dr. Sanjay Kr. Jha	Member	
		Dr. A.K. Roy (Mechanical)	Member	Dr. A.K. Roy (Mechanical)	Member	
		Dr. Anupam Ghosh (Chemical)	Member	Dr. Anupam Ghosh (Chemical)	Member	

8. Department / Off-Campus: Electrical and Electronic Engg.						
Sl.No	Name of the scholars & Roll No.	Existing Committee	Proposed Committee			Reason for change
1.	Brij Mohan Prasad Ph.D./EE/1055/2010	HOD, EEE (Ex-Office)	Chair- man	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. S.Kumar	Guide & Member	
		Dr. T.Ghose	Member	Dr. T.Ghose	Member	
		Dr. D.K. Mohanta	Member	Dr. D.K. Mohanta	Member	
		Dr. Anjani Tiwary (ECE)	Member	Dr. Anjani Tiwary (ECE)	Member	
		Dr. Ashok Kr. Roy (Me- chanical)	Member	Dr. Ashok Kr. Roy (Me- chanical)	Member	
2.	Prabhat Ranjan Tripa- thi Ph.D./EE/10006/2016	HOD, EEE (Ex-Office)	Chair- man	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. (Mrs.) Vijay Laxmi	Guide & Member	
		Dr. R.K. Keshri	Member & Co- Guide	Dr. R.K. Keshri	Member & Co-Guide	
		Dr. D.K. Mohanta	Member	Dr. D.K. Mohanta	Member	
		Dr. (Mrs.) S. Chakraborty	Member	Dr. (Mrs.) S. Chakraborty	Member	
		Dr. Aminul Islam (ECE)	Member	Dr. Aminul Islam (ECE)	Member	
		Dr. Sanjay Kr. Jha (Production)	Member	Dr. Sanjay Jha (Produc- tion)	Member	

3.	Vijay Kumar Karan Ph.D./EE/10002/2012	HOD, EEE (Ex-Office)	Chair- man	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. Aftab Alam	Guide & Member	
		Dr. A.N. Thakur Dept. of EE, NIT Jam- shedpur	Member & Exter- nal Guide	Dr. A.N. Thakur Dept. of EE, NIT Jam- shedpur	Member & External Guide	
		Dr. T.Ghose	Member	Dr. T.Ghose	Member	
		Dr. (Mrs.) Vijay Laxmi	Member	Dr. (Mrs.) Vijay Laxmi	Member	
		Dr. Vijay Nath (ECE)	Member	Dr. Vijay Nath (ECE)	Member	
		Dr. Sanjay Kr. Jha (Production)	Member	Dr. Sanjay Kr. Jha (Pro- duction)	Member	
4.	Avanish Kumar Ph.D./EE/10002/2013	HOD, EEE (Ex-Office)	Chair- man	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. Abtab Alam	Guide & Member	
		Dr. T.Ghose	Member	Dr. T.Ghose	Member	
		Dr. S. Shiva Kumar	Member	Dr. S. Shiva Kumar	Member	
		Dr. Vijay Nath (ECE)	Member	Dr. Vijay Nath (ECE)	Member	
		Dr. S.C. Srivastava (Production)	Member	Dr. S.C. Srivastava (Pro- duction)	Member	

5.	Piyush Kumar Ojha Ph.D./EE/1054/2010	HOD, EEE (Ex-Office)	Chairman	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. S. Shiva Kumar	Guide & Member	
		Dr. T.Ghose	Member	Dr. T.Ghose	Member	
		Dr. D.K. Mohanta	Member	Dr. D.K. Mohanta	Member	
		Dr. (Mrs.) Nisha Gupta (ECE)	Member	Dr. (Mrs.) Nisha Gupta (ECE)	Member	
		Dr. Pravin Mishra (Mechanical)	Member	Dr. Pravin Mishra (Mechanical)	Member	
6.	Prabhat Kumar Ranjan Ph.D./EE/1004/2011	HOD, EEE (Ex-Office)	Chairman	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. P.R. Thakura	Guide & Member	Dr. S.Shiva Kumar	Guide & Member	
		Dr. D.K. Mohanta	Member	Dr. D.K. Mohanta	Member	
		Dr. (Mrs.) Vijay Laxmi	Member	Dr. (Mrs.) Vijay Laxmi	Member	
		Dr. Vijay Nath (ECE)	Member	Dr. Vijay Nath (ECE)	Member	
		Dr. D.K. Mallick (CSE)	Member	Dr. D.K. Mallick (CSE)	Member	
7.	Aayagari Sai Lalitha Ph.D./EE/10051/2019	HOD, EEE (Ex-Office)	Chairman	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. (Mrs.) S. Chakraborty	Guide & Member	Dr. (Mrs.) S. Chakraborty	Guide & Member	
		Dr. P.R. Thakura	Member & Co-Guide	Dr. S.Shiva Kumar	Member & Co-Guide	

		Dr. T.Ghose	Member	Dr. T.Ghose	Member	
		Dr. (Mrs.) Vijay Laxmi	Member	Dr. (Mrs.) Vijay Laxmi	Member	
		Dr. R.P. Sharma (Mechanical)	Member	Dr. R.P. Sharma (Mechanical)	Member	
		Dr. Srikanta Pal (ECE)	Member	Dr. Srikanta Pal (ECE)	Member	
8.	Sumit Kumar Jha	HOD, EEE (Ex-Office)	Chairman	HOD, EEE (Ex-Office)	Chairman	Demise of Dr. P.R. Thakura.
		Dr. Deepak Kumar	Guide & Member	Dr. Deepak Kumar	Guide & Member	
		Dr. P.R. Thakura	Member	Dr. S.K. Mishra	Member	
		Dr. D.K. Mohanta	Member	Dr. D.K. Mohanta	Member	
		Dr. S.Mohapatra (CSE)	Member	Dr. S.Mohapatra (CSE)	Member	
		Dr. Sitanshu Sekhar Sahu (ECE)	Member	Dr. Sitanshu Sekhar Sahu (ECE)	Member	
9.	Shilpee Ph.D./EE/10051/2016	HOD, EEE (Ex-Office)	Chairman	HOD, EEE (Ex-Office)	Chairman	External guide is unable to give sufficient time because of his academic load and is unwilling to continue anymore
		Dr. (Mrs.) S. Chakraborty	Guide & Member	Dr. (Mrs.) S. Chakraborty	Guide & Member	
		Dr. T.S. Chandar	External Guide	Dr. (Mrs.) Vijay Laxmi	Member	
		Dr. (Mrs.) Vijay Laxmi	Member	Dr. S.K. Mishra	Member	
		Dr. S.K. Mishra	Member	Dr. (Mrs.) Nisha Gupta (ECE)	Member	
		Dr. (Mrs.) Nisha Gupta (ECE)	Member	Dr. (Mrs.) Anjana Pradhan Ghorai (Math)	Member	
		Dr. (Mrs.) Anjana Pradhan Ghorai (Math)	Member			

9. Department / Off-Campus: Space Engineering Rocketry						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Pawan Kumar Karn Ph.D./SER/10051/2016	HOD, SER (Ex-Office)	Chairman	HOD, SER (Ex-Office)	Chairman	Dr. Arun Dayal Udai left the Institute
		Dr. Priyank Kumar	Guide & Member	Dr. Priyank Kumar	Guide & Member	
		Dr. Sudip Das	Member & Co-Guide	Dr. Sudip Das	Member & Co-Guide	
		Dr. Partha Mondal	Member	Dr. Partha Mondal	Member	
		Dr. R.P. Sharma (Mechanical)	Member	Dr. R.P. Sharma (Mechanical)	Member	
		Dr. Arun Dayal Udai (Mechanical)	Member	Dr. Lakhbir Singh Brar (Mechanical)	Member	

10. Department / Off-Campus: Computer Science & Engineering						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Mr. Devesh Kumar Upadhayay Ph.D./CS/10052/17	HOD, CSE	Chairman (Ex-Office)	HOD, CSE	Chairman (Ex-Office)	Due to change in solving approach from mathematical to classification using machine learning techniques. Dr. S. Mohapatra, the proposed co-guide, has expertise in this newly adopted technique
		Dr. Niraj Kumar Singh	Guide & Member	Dr. Niraj Kumar Singh	Guide & Member	
		Dr. Randhir Singh (Math)	Member & Co-Guide	Dr. S. Mohapatra	Member & Co-Guide	
		Dr. Kumar Rajnish	Member	Dr. Shamama Anwar	Member	
		Dr. V.K.Jha	Member	Dr. V.K.Jha	Member	
		Dr. Anjana Pradhan Ghorai (Math)	Member	Dr. S Mishra (EEE)	Member	
		Dr. Kartik Mahto (ECE)	Member	Dr. (Mrs.) Swati Prasad (ECE)	Member	

11. Department / Off-Campus: BITEC, Patna						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	ANULAL MAHTO (Ph.D./PE/10054/2013)	Director, BITEC, Patna	Chairman (Ex-Office)	Director, BITEC, Patna	Chairman (Ex-Office)	Demise of Dr. B.K. Singh
		Dr. B.K. Singh (Production)	Guide & Member	Dr. Manish Oraon (Pro- duction)	Guide & Mem- ber	
		Dr. S.P. Lal (Production)	Member	Dr. S.P. Lal (Production)	Member	
		Dr. Kanhaiya Lal (CSE)	Member	Dr. Kanhaiya Lal (CSE)	Member	
		Dr. S.K. Pradhan (Mechanical)	Member	Dr. S.K. Pradhan (Me- chanical)	Member	
		Dr. Ravi Shankar (Mechanical)	Member	Dr. Ravi Shankar (Me- chanical)	Member	
		Dr. P.C. Srivastava (Math)	Member	Dr. P.C. Srivastava (Math)	Member	

12. Department / Off-Campus: BITEC, Noida						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Sandeep Kaur Ph.D./CS/10003/2017	Director, BITEC, Noida	Chairman (Ex-Office)	Director, BITEC, Noida	Chairman (Ex-Office)	Dr. S.P. Singh transferred in BIT Mesra Ranchi
		Dr. B.B. Sagar	Guide & Member	Dr. B.B. Sagar	Guide & Member	
		Dr. Vibha Kaw Raina	Member	Dr. Vibha Kaw Raina	Member	
		Dr. S.P. Singh	Member	Dr. D.K. Lobiyal	External Member	

		Dr. (Mrs.) Meenakshi Sharma	Member & Ph.D. Coordinator	Dr. Archna Singhal	External Member	
		Dr. D.K. Lobiyal	External Member			
		Dr. Archna Singhal	External Member			
2.	Narendra Nath Mahto Ph.D./MB/10008/2012	Director, BITEC, Noida	Chairman (Ex-Office)	Director, BITEC, Noida	Chairman (Ex-Office)	Dr. Munish Makkad has been Supernnuated
		Dr. Munish Makkad	Guide & Member	Dr. (Mrs.) Vandana Sharma	Guide & Member	
		Dr. S.K. Dam	External Guide	Dr. Munish Makkad	External Guide	
		Dr. Abhishek Kumar	Member	Dr. S.K. Dam	External Co-Guide	
		Dr. (Mrs.) Meenakshi Sharma	Member & Ph.D. Coordinator	Dr. Abhishek Kumar	Member	
		Dr. G.S. Sood	External Member	Dr. G.S. Sood	External Member	
		Dr. Muneesh Kumar	External Member	Dr. Muneesh Kumar	External Member	
3.	Ekta Saraswat Ph.D./MB/10012/2014	Director, BITEC, Noida	Chairman (Ex-Office)	Director, BITEC, Noida	Chairman (Ex-Office)	Dr. K.B. Singh left the Institute
		Dr. Abhishek Singh	Member & Guide	Dr. Abhishek Singh	Member & Guide	
		Dr. K.B. Singh	Member	Dr. (Mrs.) Meenakshi Sharma	Member	
		Dr. Y.P. Singh	External Member	Dr. Y.P. Singh	External Member	
		Dr. Deepak Tondan	External Member	Dr. Deepak Tondan	External Member	

13. Department / Off-Campus: BITEC, Jaipur						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Mukesh Kumar Ph.D./MB/10016/2012	Director, BITEC, Jaipur	Chairman (Ex-officio)	Director, BITEC, Jaipur	Chairman (Ex-officio)	The original Guide Dr. Ritu Arora is on leave and went abroad for more than one year.
		Dr. (Mrs.) Ritu Arora Asstt. Prof. Dept. of Mgt.	Guide	Dr. (Mrs.) Roopali Sharma, Asstt. Prof. Dept. of Mgt.	Guide	
		Dr. (Mrs.) Roopali Sharma, Asstt. Prof. Dept. of Mgt.	Member	Dr. (Mrs.) Ritu Arora Asstt. Prof. Dept. of Mgt.	Member & Co-Guide	Due to unfortunate sudden demise of PF avdhesh Bhardwaj he has been replaced by Dr. Satish Kfumar of MNIT Jaipur
		Dr. G.S. Dangayach Asstt. Professor, Dept. of Mechanical Engg. & Adjunct Faculty MNIT Jaipur	External Member	Dr. G.S. Dangayach Asstt. Professor, Dept. of Mechanical Engg. & Adjunct Faculty MNIT Jaipur	External Member	

14. Department / Off-Campus: BITEC, Deoghar						
Sl. No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Sachin Khedekar Ph.D./EC/1008/2011	Director, BITEC, Deoghar	Chairman (Ex-officio)	Director, BITEC, Deoghar	Chairman (Ex-officio)	As Dr. Soumya Banerjee left the Institute
		Dr. Mainak Mukhopadhyay	Member & Guide	Dr. Mainak Mukhopadhyay	Member & Guide	
		Dr. Soumya Banerjee	Member	Dr. Vinay Sharma	Member	
		Dr. S.K. Ghorai (ECE) BIT Mesra	Member	Dr. R.K. Sarkar	Member	
		Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	Dr. Chinmay Chakraborty	Member	
				Dr. S.K. Ghorai (ECE) BIT Mesra	Member	
				Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	
2.	Rachna Kumari Ph.D./EC/1007/2011	Director, BITEC, Deoghar	Chairman (Ex-officio)	Director, BITEC, Deoghar	Chairman (Ex-officio)	Sufficient no of faculty member having Ph.D. degree are now available at BIT Deoghar
		Dr. Mainak Mukhopadhyay	Member & Guide	Dr. Mainak Mukhopadhyay	Member & Guide	
		Dr. Ashish Chakraborty	Member	Dr. Ashish Chakraborty	Member	
		Dr. S.K. Ghorai (ECE) BIT Mesra	Member	Dr. K.N. Mishra	Member	
		Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	Dr. Chinmay Chakraborty	Member	
				Dr. S.K. Ghorai (ECE) BIT Mesra	Member	
				Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	

3.	Sitakanta Maharatha Ph.D./EC/1009/2011	Director, BITEC, Deoghar	Chairman (Ex-officio)	Director, BITEC, Deoghar	Chairman (Ex-officio)	Transfer of Dr. R.K. Paul from BIT Mesra Ranchi
		Dr. Mainak Mukhopadhyay	Member & Guide	Dr. Mainak Mukhopadhyay	Member & Guide	
		Dr. R.K. Paul	Member	Dr. Chinmay Chakraborty	Member	
		Dr. S.K. Ghorai (ECE) BIT Mesra	Member	Dr. K.N. Mishra	Member	
		Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	Dr. Vinay Sharma	Member	
				Dr. S.K. Ghorai (ECE) BIT Mesra	Member	
				Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	
4.	Brijesh Kumar Singh Ph.D./Ec/1058/2010	Director, BITEC, Deoghar	Chairman (Ex-officio)	Director, BITEC, Deoghar	Chairman (Ex-officio)	Transfer of Dr. R.K. Paul from BIT Mesra Ranchi
		Dr. Mainak Mukhopadhyay	Member & Guide	Dr. Mainak Mukhopadhyay	Member & Guide	
		Dr. R.K. Paul	Member	Dr. Chinmay Chakraborty	Member	
		Dr. Ashish Chakraborty	Member	Dr. K.N. Mishra	Member	
		Dr. S.K. Ghorai (ECE) BIT Mesra	Member	Dr. Vinay Sharma	Member	
		Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	Dr. S.K. Ghorai (ECE) BIT Mesra	Member	
				Dr. (Mrs.) Nisha Gupta (ECE) BIT Mesra	Member	

15. Name of Department / Centre : Department of Pharmaceutical Sciences and Technology						
Sl.No	Name of the scholars & Roll No.	Existing Committee		Proposed Committee		Reason for change
1.	Sheikh Murtuja PHD/PH/10051/2016	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Rahul has Resigned to join other Institute
		Dr. B.N. Sinha	Guide	Dr. B.N. Sinha	Guide	
		Dr. Venkatesan J.	Co-guide	Dr. Venkatesan J.	Co-guide	
		Dr. S. Samanta	Member	Dr. S. Samanta	Member	
		Dr. (Ms.) S. Ganguly	Member	Dr. (Ms.) S. Ganguly	Member	
		Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	
		Dr. Rahul Dept. of Chemistry	Member	Dr. P.K. Srivastava Dept. of Chemistry	Member	
2.	Suparna Roy Sarkar PHD/PH/10002/2017	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. Sugato Banerjee	Guide	Dr. (Mrs.) Papiya M. Mazumder	Int. Guide	
		Dr. (Mrs.) Papiya M. Mazumder	Member	Dr. Sugato Banerjee	Ext. Guide	

		Dr. Venkatesan J.	Member	Dr. Venkatesan J.	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. K. Jayaram Kumar	Member	
		Dr. Gautam Sarkhel (Dept. of of Chemical Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
			Member	Dr. Gautam Sarkhel (Dept. of Chemical Engg.)	Member	
3.	Syed Mohammad Abdullah PHD/PH/10001/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. (Mrs.) Papiya M. Mazumder	Guide	Dr. (Mrs.) Papiya M. Mazumder	Guide	
		Dr. Sugato Banerjee	Member	Dr. Swastika Ganguly	Member	
		Dr. K. Jayaram Kumar	Member	Dr. K. Jayaram Kumar	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
		Dr. Gautam Sen (Dept. of Chemistry)	Member	Dr. Gautam Sen (Dept. of Chemistry)	Member	

4.	Roja Sahu PHD/PH/10006/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Shakti P. Pattanayak has Resigned to join other Institute Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. Shakti P. Pattanayak	Guide	Dr. S. Jha	Int. Guide	
		Dr. Sugato Banerjee	Member	Dr. Shakti P. Pattanayak	Ext. Guide	
		Dr. Sandeep Kr. Singh	Member	Dr. Ashok Kr. Pattnaik	Member	
		Dr. Ashoke Sharon (Dept. of Chemistry)	Member	Dr. Sandeep Kr. Singh	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Ashoke Sharon (Dept. of Chemistry)	Member	
				Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
5.	Smriti Tripathi PHD/PH/10008/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. (Mrs.) Papiya M. Mazumder	Guide	Dr. (Mrs.) Papiya M. Mazumder	Guide	
		Dr. Sugato Banerjee	Member	Dr. K. Jayaram Kumar	Member	
		Dr. (Mrs.) Neelima Sharma	Member	Dr. (Mrs.) Neelima Sharma	Member	
		Dr. (Mrs.) Usha Jha (Dept. of Chemistry)	Member	Dr. (Mrs.) Usha Jha (Dept. of Chemistry)	Member	

		Dr. R.K. Sinha (Dept. of Bio-Engg.)	Member	Dr. R.K. Sinha (Dept. of Bio-Engg.)	Member	
6	Ravi Rawat PHD/PH/10009/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. (Mrs.) S.M. Verma	Guide	Dr. (Mrs.) S.M. Verma	Guide	
		Dr. (Ms.) Swastika Ganguly	Member	Dr. (Ms.) Swastika Ganguly	Member	
		Dr. Sugato Banerjee	Member	Dr. Ashok Kumar Pattnaik	Member	
		Dr. Ashoke Sharon (Dept. of Chemistry)	Member	Dr. Ashoke Sharon (Dept. of Chemistry)	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	

7.	Reetuparna Acharya PHD/PH/10051/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Shakti P. Pattanayak has Resigned to join other Institute Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. Shakti P. Pattanayak	Guide	Dr. S. Jha	Int. Guide	
		Dr. Sandeep Kr. Singh	Member	Dr. Shakti P. Pattanayak	Ext. Guide	
		Dr. Sugato Banerjee	Member	Dr. Sandeep Kr. Singh	Member	
		Dr. Ashoke Sharon (Dept. of Chemistry)	Member	Dr. (Mrs.) Neelima Sharma	Member	
		Dr. Vinod K. Nigam (Dept. of Bio-Engg.)	Member	Dr. Ashoke Sharon (Dept. of Chemistry)	Member	
				Dr. Vinod K. Nigam (Dept. of Bio-Engg.)	Member	
8.	Gourav Kumar Singh PHD/PH/10053/2018	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Shakti P. Pattanayak has Resigned to join other Institute
		Dr. Sandeep Kr. Singh	Guide	Dr. Sandeep Kr. Singh	Guide	
		Dr. (Mrs.) Trishna Bal	Member	Dr. (Mrs.) Trishna Bal	Member	
		Dr. Shakti P. Pattanayak	Member	Dr. M.P. Chopra	Member	

		Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	
		Dr. Yogender Aggarwal (Dept. of Bio-Engg.)	Member	Dr. Yogender Aggarwal (Dept. of Bio-Engg.)	Member	
9.	Amrita Chatterjee, PHD/PH/10001/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. Biswatrish Sarkar	Guide	Dr. Biswatrish Sarkar	Guide	
		Dr. Swastika Ganguly	Member	Dr. Swastika Ganguly	Member	
		Dr. Sugato Banerjee	Member	Dr. (Mrs.) Papiya Mitra Mazumder	Member	
		Dr. Gautam Sarkhel (Dept. of Chemical Engg.)	Member	Dr. Gautam Sarkhel (Dept. of Chemical Engg.)	Member	
		Dr. Shashwati Ghosh Sachan (Dept. of Bio-Engg.)	Member	Dr. Shashwati Ghosh Sachan (Dept. of Bio-Engg.)	Member	

10.	Kaberi Chatterjee PHD/PH/10002/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. Sugato Banerjee	Guide	Dr. (Mrs.) Papiya M. Mazumder	Int. Guide	
		Dr. (Mrs.) Papiya M. Mazumder	Member	Dr. Sugato Banerjee	Ext. Guide	
		Dr. Venkatesan J.	Member	Dr. Venkatesan J.	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Biswatrish Sarkar	Member	
		Dr. Anupam Roy (Dept. of Chemical Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
				Dr. Anupam Roy (Dept. of Chemical Engg.)	Member	
11.	Mansi Agrawal, PHD/PH/10008/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. (Mrs.) Papiya M. Mazumder	Guide	Dr. (Mrs.) Papiya M. Mazumder	Guide	
		Dr. Sugato Banerjee	Member	Dr. (Mrs.) Anima Pandey	Member	

		Dr. Animesh Ghosh	Member	Dr. Animesh Ghosh	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
		Dr. Sumit Mishra (Dept. of Chemistry)	Member	Dr. Sumit Mishra (Dept. of Chemistry)	Member	
12.	Aditya Dev Rajora, PHD/PH/10009/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Sugato Banerjee has Resigned to join other Institute
		Dr. (Mrs.) Trishna Bal	Guide	Dr. (Mrs.) Trishna Bal	Guide	
		Dr. Sandeep Kumar Singh	Member	Dr. Sandeep Kumar Singh	Member	
		Dr. Sugato Banerjee	Member	Dr. Ashok Kr. Pattnaik	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
		Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	Dr. Akhil Kumar Sen (Dept. of Chemical Engg.)	Member	

13.	Mahendra Pratap Swain, PHD/PH/10010/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Dr. Shakti Prasad Pattanayak has Resigned to join other Institute
		Dr. Sandeep Kumar Singh	Guide	Dr. Sandeep Kumar Singh	Guide	
		Dr. (Mrs.) Trishna Bal	Member	Dr. (Mrs.) Trishna Bal	Member	
		Dr. Shakti Prasad Pattanayak	Member	Dr. M.P. Chopra	Member	
		Dr. (Mrs.) Usha Jha (Dept. of Chemistry)	Member	Dr. (Mrs.) Usha Jha (Dept. of Chemistry)	Member	
		Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	Dr. Kunal Mukhopadhyay (Dept. of Bio-Engg.)	Member	
14.	Priyanka Chandra PHD/PH/10058/2019	HOD, Pharmacy (Ex-Office)	Chairman	HOD, Pharmacy (Ex-Office)	Chairman	Scholar wants to specifically work on Pharmaceutical Chemistry based topic.
		Dr. Manik	Guide	Dr. Manik	Guide	
		Dr. (Mrs.) Papiya M. Mazumder	Member	Dr. Swastika Ganguly	Co-Guide	
		Dr. Venkatesan J.	Member	Dr. (Mrs.) Papiya M. Mazumder	Member	
		Dr. Subhendu Naskar (Dept. of Chemistry)	Member	Dr. Venkatesan J.	Member	
		Dr. Shashwati Ghosh Sachan (Dept. of Bio-Engg.)	Member	Dr. Subhendu Naskar (Dept. of Chemistry)	Member	
				Dr. Shashwati Ghosh Sachan (Dept. of Bio-Engg.)	Member	

6. **ADDITION /CHANGE OF GUIDE**

Sl. No.	Name of the Scholars & Roll No.	Existing Guide	Proposed Guide	Remarks/Reason for change	Dept. /Campus
1.	Arpita Roychoudhury Ph.D./PE/1051/2011	Dr. Vinay Sharma (Guide) Dr. B.K. Singh (Co-Guide)	Dr. Ritesh Kumar Singh (Guide)	On the request of Ph.D. Scholar and consent of the existing Guide and Co-guide	Production
2.	Ram Babu Verma Ph.D./PE/10052/2013	Dr. J. Ghose (Guide) Dr. Dr. Agrawal (Co-Guide)	Dr. Sanjay Kumar Jha (Guide)	On the request of Ph.D. Scholar and consent of the existing Guide and Co-guide	Production
3.	Suparna Roy Sarkar Ph.D./PH/10002/2017	Papiya Mitra Mazumder (Guide) Dr. Sugato Banerjee (Co-Guide)	Dr. Papiya M. Majumder (Guide) Dr. K. Jayram Kumar (Co-Guide)	Dr. Gugato Banerjee due to resignation & joining to other Institution	Pharmacy
5.	Kaberi Chatterjee Ph.D./PH/10002/2019	Papiya Mitra Mazumder (Guide) Dr. Sugato Banerjee (Co-Guide)	Dr. Papiya M. Majumder (Guide) Dr. Biswatrish Sarkar (Co-Guide)	Dr. Gugato Banerjee due to resignation & joining to other Institution	Pharmacy
6.	Nisha Kumari Singh Ph.D./PH/10006/2009	Dr. Kishanta Kr. Pradhan (Guide)	Dr. (Ms.) Swastika Ganguly (Guide)	Scholar wants to specifically work on Pharmaceutical Chemistry based topic	Pharmacy
7.	Vishal h. Shah Ph.D./EC/10009/2019	Dr. Mahesh Chandra (Guide)	Dr. P.P. Dash (Guide)	Dr. Mahesh Chandra is not in service of BIT. Candidate has completed one semester. Candidate's research interest is image processing D.C. recommended Dr. P.P. Dash as Guide	ECE
8.	Ashutosh Anand Ph.D./EC/10052/2015	Dr. Sudip Kundu (Guide)	Dr. Srikanta Pal (Guide)	Dr. Sudip Kundu has left the Institute.	ECE
9.	Arbind Kumar Ph.D./EC/10056/2016	Dr. Mahesh Chandra (Guide)	Dr. S.S.Solanki (Guide) Dr. Mahesh Chandra (External Guide)	Dr. Mahesh Chandra has left the Institute and Dr. P.R. Thakura is demised. The scholar has requested for Dr. S.S. Solanki as his Guide. The DAC recommended Dr. Solanki as Guide and Dr. Mahesh Chandra as External Guide, as per institute rule and the DC members decision on the on the area of research work.	ECE

10.	Monalisa Pandey Ph.D./EC/10052/2019	Dr. M.K. Mukul (Guide)	Dr. Aminul Islam (Guide)	Dr. Aminul Islam has been allotted as the Guide by the Institute. Accordingly, title of the thesis is changed to “Design of Radiation Hardened Semiconductor Memory”. The DAC also recommended the new DC members based on the area of research work.	ECE
9.	Geetanjali Singh Ph.D./EC/10003/2017	Dr. Sudip Kundu (Guide)	Dr. srikanta Pal (Guide)	Dr. Sudip Kundu has left the Institute.	ECE
10.	Mr. Brij Mohan Prasad Ph.D./EE/1055/10	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr. S. Kumar, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
11.	Mr. Prabhat Ranjan Tripathi Ph.D./EE/10006/2016	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr.(Mrs.) V. Laxmi, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
12.	Mr. V. K. Karan Ph.D./EE/10002/2012	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr. Aftab Alam, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
13.	Mr. Avanish Kumar Ph.D./EE/10002/2013	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr. Aftab Alam, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
14.	Mr. Piyush Kumar Ojha Ph.D./EE/1054/10	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr. S. Shiva Kumar, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
15.	Mr. Prabhat Kumar Ranjan Ph.D./EE/1004/2011	Dr. P.R.Thakura, Dept. of EEE, Member & Guide	Dr. S. Shiva Kumar, Dept. of EEE, Member & Guide	Demise of Dr. P.R. Thakura	EEE
16.	Ms. Aayagari Sai Lalitha Ph.D./EE/1051/2019	Dr. S. Chakraborty, Dept. of EEE, Member & Guide Dr. P.R. Thakura Co-guide	Dr. S. Chakraborty, Dept. of EEE, Member & Guide Dr. S.Shiva Kumar Co-guide	Demise of Dr. P.R. Thakura	EEE

17.	Ms. Shilpee Ph.D./EE/10051/16	Dr. (Mrs.) S. Chakraborty, Member & Guide Dr. T.S. Chandar Member & External Guide	Dr. (Mrs.) S. Chakraborty, Member & Guide	Ext-guide is unable to give sufficient time because of his academic load and is unwilling to continue anymore	EEE
18.	Devesh Kumar Upadhyay Ph.D./CS/10052/2017	Dr. Niraj Kumar Singh (Guide) Dr. Randhir Singh, (Math) (Co-Guide)	Dr. Niraj Kumar Singh (Guide) Dr. Subrajeet Mohapatra	Due to change in solving approach from mathematical to classification using machine learning, techniques Dr. S. Mohapatra the proposed Co-Guide, has expertise in this newly adopted technique	CSE
19.	Mr. Ritesh Jha Ph.D./CS/10012/2018	Dr. V. Bhattacharjee (Guide)	Dr. V. Bhattacharjee (Guide) Dr. Abhijit Mustafi (Co-Guide)	Due to matching area of research	CSE
20.	Kanchan Lakra Ph.D./CEE/10053/2018	Dr. Koushik Paul	Dr. Kirti Avishkek	Resignation of Dr. Koushik Paul	CEE
21.	Kumari Anandita Ph.D./CEE/10051/2018	Prof. Anand Kr. Sinha – Guide	Prof. Anand Kr. Sinha, (Guide) & Prof. C. Jegannathan (Co-Guide)	Request of Scholar	CEE
22.	ANULAL MAHTO Ph.D./PE/10054/2013	LATE DR. B.K. SINGH (Guide)	DR. MANISH ORAON (Guide)	Demise of Dr. B.K. Singh	BITEC, Patna
23.	Suparna Roy Sarkar PHD/PH/10002/2017	Dr. Sugato Banerjee (Guide)	Dr. (Mrs.) Papiya M. Mazumder (Internal Guide) Dr. Sugato Banerjee (External Guide)	Dr. Sugato Banerjee has Resigned to join other Institute	Pharmacy
24.	Roja Sahu PHD/PH/10006/2018	Dr. Shakti P. Pattanayak (Guide)	Dr. S. Jha (Guide) Dr. Shakti P. Pattanayak (External Guide)	Dr. Shakti P. Pattanayak has Resigned to join other Institute	Pharmacy

25.	Reetuparna Acharya PHD/PH/10051/2018	Dr. Shakti P. Pattanayak (Guide)	Dr. S. Jha (Guide) Dr. Shakti P. Pattanayak (External Guide)	Dr. Shakti P. Pattanayak has Resigned to join other Institute	Pharmacy
26.	Mukesh Kumar Ph.D./MB/10016/2012	Dr.(Mrs.) Ritu Arora (Guide)	Dr. (Mrs.) Roopali Sharma (Guide) Dr. (Mrs.) Ritu Arora (Co-Guide)	Earned Leaves for 85 days (8.7.2019 to 30.11.2019) and then extraordinary) leave of one year (1.12.2019 to 3.9.2020) taken by the Guide of the Scholar Dr. Ritu Arora, Assistant Professor, Management Dept. for going abroad for personal reason. The Leave of Dr. Ritu Arora was duly sanctioned by the competent Authority	BITEC, Jaipur

7. DE-REGISTRATION FROM THE Ph.D. PROGRAMME

Sl. No.	Name & Roll No. Scholars	Department/ Campus Centre	Reason for change
1.	Ajay Kumar Kapardar Ph.D./ME/1001/2011	Mechanical	Permanent withdrawal taken by the scholar from the programme
2.	Xaxa Aman Rupesh Ph.D./AR/10051/2018	Architecture	Permanent withdrawal taken by the scholar from the programme
3.	Anisha Mukherjee Ph.D./CS/10070/2017	CSE	Permanent withdrawal taken by the scholar from the programme
4.	Prashant Kumar Ph.D./BE/10051/2018	Bio Engg.	Permanent withdrawal taken by the scholar from the programme
5.	Subodh Suman Ph.D./CEE/10052/2015	CEE	The scholar has not registered for last two semesters & not responded to subsequent phone calls of guide
6.	Archana Smrity Khalkho Ph.D./EC/10051/2014	ECE	The scholar has not registered for last 3 years.
7.	Rocky Kumar Ph.D./EC/10001/2015	ECE	Permanent withdrawal taken by the scholar from the programme
8.	Mrs. Ancy Nimsha Sreenivasam Ph.D./MB/10009/2014	Management	No communication since 2017
9.	Ms. Dipti Prabha Ph.D./MB/10054/2017	Management	Has withdrawn from the programme
10.	Abhinandan Chatterjee Ph.D./MB/10002/2017	Management	Has withdrawn from the programme
11.	Ananya Goswami Ph.D./MB/100067/2013	Management	Wants to withdraw from the programme

8. PERMISSION FOR EXTENSION FOR PURSUING Ph.D. PROGRAMME

S.N	Name of the Scholars	Roll No.	Duration of Extension	Dept/Centre
1.	Annie Jessica Toppo	Ph.D./BT/10001/2013	SP 2020 & MO 2020 (1 year)	Bio Engg.
2.	Sweta Verma	Ph.D./BT/10052/2012	SP 2020 & MO 2020 (1 year)	Bio Engg.
3.	Arpita Roychoudhury	Ph.D./PE/1051/2011	SP 2020 & MO 2020 (1 year)	Production
4.	Rambabu Verma	Ph.D./PE/10053/2013	SP 2020 (6 Months)	Production
5.	Swati Minz	Ph.D./MB/10016/2013	SP 2020 (6 Months)	BITEC, Lalpur
6.	Shreya Patel	Ph.D./MB/10003/2012	SP 2020 (6 Month)	BITEC, Lalpur
7.	Sumona Das	Ph.D./MB/10052/2013	SP 2020 & MO 2020 (1 year)	BITEC, Lalpur
8.	Farhar Alam	Ph.D./MB/10053/2013	SP 2020 & MO 2020 (1 year)	BITEC, Lalpur
9.	Maya Singh	Ph.D./MB/10066/2013	SP 2020 & MO 2020 (1 year)	BITEC, Lalpur
10.	Kunal	Ph.D./MB/10051/2013	SP 2020 (6 Month)	BITEC, Lalpur
11.	Parthasarathi Mohanty	Ph.D./AP/10053/2013	SP 2020 & MO 2020 (1 year)	Physics
12.	Nalin Prashant Poddar	Ph.D./AP/10001/2013	SP 2020 (6 Month)	Physics
13.	Abhilash Bajpai	Ph.D./AP/10005/2013	SP 2020 (6 Months)	Physics
14.	Pritam Yadav	Ph.D./AP/10054/2013	SP 2020 (6 Months)	Physics
15.	Sujata Prayambada Dash	Ph.D./86/2010	SP 2020 (6 Month)	Management
16..	Shailendra Kumar Singh	Ph.D./MB/1051/2011	SP 2020 (6 Month)	Management
17.	Shelly Srivastava	Ph.D/MB/10052/2013	SP 2020 & MO 2020 (1 year)	Management
18.	Narmdeshwar Sahay	Ph.D./CE/1053/2010	SP 2020 & MO 2020 (1 year)	CEE
19.	Meeta Verma	Ph.D.D/CE/1052/2010	SP 2020 (6 Month)	CEE
20.	Sheelu Kumari	Ph.D./EC/10008/2012	SP 2020 (6 Month)	ECE
21.	Atul Kumar Pandey	Ph.D./EC/1004/2011	SP 2020 (6 Month)	ECE
22.	Qurratullain	Ph.D./58/2020	SP 2020 (6 Month)	ECE
23.	P.V.S. Murali Krishna	Ph.D./EC/1051/2010	SP 2020 (6 Month)	ECE
24.	Maqubool Hosain	Ph.D./EC/10005/2013	SP 2020 (1 year)	ECE
25.	Vishal Kumar	Ph.D./EC/10009/2012	SP 2020 & MO 2020 (1 year)	ECE
26.	Sharmila Biswas	Ph.D./EC/10006/2012	SP 2020 & MO 2020 (1 year)	ECE
27.	Deo Kumar	Ph.D./EC/10055/2013	SP 2020 & MO 2020 (1 year)	ECE
28.	Santashraya Prasad	Ph.D./EC/10063/2013	SP 2020 & MO 2020 (1 year)	ECE
29.	Sakshi Kumari	Ph.D./59/2010	SP 2020 (6 month)	ECE
30.	Mukesh Kumar Ojha	Ph.D./EC/1052/2011	SP 2020 & MO 2020 (1 year)	ECE
31.	Sravanth Kumar Ramkumari	Ph.D./EC/10014/2012	SP 2020 & MO 2020 (1 year)	ECE
32.	Neha Rajak	Ph.D./EC/10003/2014	SP 2020 (6 Months)	ECE
33.	Pranata Hazra	Ph.D./RS/10001/2014	SP 2020 (6 month)	Remote sensing
34.	Prem Prakash	Ph.D/EE/1051/2010	SP 2020 & MO 2020 (1 year)	EEE
35.	Piyush Kumar Ojha	Ph.D./EE/1054/2010	SP 2020 & MO 2020 (1 year)	EEE

36.	Brij Mohan Prasad	Ph.D./EE/1055/2010	SP 2020 & MO 2020 (1 year)	EEE
37.	Prabhat Kumar Ranjan	Ph.D./EE/1004/2011	SP 2020 & MO 2020 (1 year)	EEE
38.	Vijay Kumar Karan	Ph.D./EE/10002/2012	SP 2020 & MO 2020 (1 year)	EEE
39.	Avanish Kumar	Ph.D./EE/10002/2013	SP 2020 & MO 2020 (1 year)	EEE
40.	Prakash Kumar Singh	Ph.D./CS/10001/2013	SP 2020 & MO 2020 (1 year)	CSE
41.	Amit Kumar Keshari	Ph.D./CS/10003/2013	SP 2020 & MO 2020 (1 year)	CSE
42.	Punit Singh Duggal	Ph.D./CS/10019/2012	SP 2020 & MO 2020 (1 year)	CSE
43.	Sayantani Basu	Ph.D./CHP/10051/2013	SP 2020 (6 month)	Chemical
44.	Abhijit Shankar jadhav	Ph.D./PL/1051/2011	SP 2020 & MO 2020 (1 year)	Chemical
45.	Gautam Mahapatra	Ph.D./CS/1010/2011	SP 2020 & MO 2020 (1 year)	BITEC, Deoghar
46.	Shradha Kishore	Ph.D./EE/10005/2013	MO 2019 (6 Month)	BITEC, Patna
47.	Rakhi Singh	Ph.D./MB/10011/2013	MO 2019 (6 Month)	BITEC, Patna
48.	Jigyasu Kumar	Ph.D./MB/10005/2013	MO 2019 (6 Month)	BITEC, Patna
49.	Kumar Nikhil	Ph.D./EE/10006/2013	MO 2019 (6 Month)	BITEC, Patna
50.	Chandan Kumar	Ph.D./ME/10052/1011	MO 2020 (6 Month)	BITEC, Patna
51.	Kanika Thakur	Ph.D./CS/10009/2012	SP 2019 to MO 2020 (2 years)	BITEC, Patna
52.	Naveen Trivedi	Ph.D./CS/10003/2013	SP 2020 & MO 2020 (1 year)	BITEC, Allahabad
53.	Vivek Srivastava	Ph.D./MB/10002/2013	SP 2020 & MO 2020 (1 year)	BITEC, Allahabad
54.	Shailendra Kumar	Ph.D./AM/10051/2013	SP 2020 & MO 2020 (1 year)	BITEC, Allahabad
55.	Sonia Saini	Ph.D./CS/10062/2013	MO 20 & SP 21 (1 year)	BITEC, Noida
56.	Prerna Agarwal	Ph.D./CS/10064/2013	MO 20 & SP 21 (1 year)	BITEC, Noida
57.	Arvind Bhisikar	Ph.D./MB/10018/2013	SP 20 to MO 21 (2 years)	BITEC, Noida
58.	Sunaina Kothari	Ph.D./MB/10061/2013	SP 20 & to SP 21 (3 Sem)	BITEC, Noida
59.	Rakesh Saur	Ph.D./RS/10005/2012	MO 2019 to SP 2020	Remote Sensing
60..	Brijesh Kumar Singh	Ph.D./EC/1058/2010	MO-19 & SP-20	ECE/BITD
61.	Gautam Mahapatra	Ph.D./CS/1060/2011	MO-20	CSE/BITD
62.	Mukesh Kumar	Ph.D./MB/10016/2012	SP-20 and MO-20	BITEC, Jaipur
63.	Neha Saini	Ph.D./MB/10015/2014	MO-20 and SP-21	BITEC, Jaipur
64.	Rinkey	Ph.D./CS/10016/2012	MO 2018 To SP 2020	BITEC, Jaipur
65.	Kashinath Chandelkhar	Ph.D./CS/10017/2012	MO 2018 To SP 2020	BITEC, Jaipur
66.	Saurabh Singh	Ph.D./CS/10052/2012	SP 2019 To SP 2020	BITEC, Jaipur
67.	Sudhir Sharma	Ph.D./CS/10061/2013	SP 2020 To SP 2021	BITEC, Jaipur

9. TRANSFER FROM FULL TIME TO PART TIME

Sl. No.	Name of the Scholars & Roll No.	Comments	Reason for Change	Dept./Centre
1.	Karan Pratap Ph.D./MB/10017/2017	The progress of research work of the scholar was found satisfactory. He submitted the application of 30 th July 2019, to convert from being a full time research scholar to a part time one. He may be permitted to do so	Got full time teaching job	Management
2.	Saugata Chakraborty Ph.D./RS/10001/2019	Got a Job. He is teaching in Shibpur Dinobundhoo Institution (College) Howrah, West Bengal.		Remote Sensing
3.	Md. Gulam Ansari Ph.D./RS/10051/2012	Got a job. He is teaching in the Dept. of Land Resource Management, Central University of Jharkhand, Ranchi		Remote Sensing

10. Transfer of PH.D. Scholar from other campus

Sl. No.	Name of the Scholars & Roll No.	From	To	Reason for Change	Dept./Centre
1	Neha Verma Ph.D./PE/	BIT Mesra Ranchi	BITEC, Deoghar	Her guide, Dr. Vinay Sharma transferred to BITEC, Deoghar	Production Engg.
2.	Md. Nayer Ph.D./CS/10056/2017	BIT Mesra, Ranchi	BITEC, Patna	Request by the scholar for transfer to B.I.T EC Patna for medical	CSE

11. **RE-STRUCTURING OF DEPARTMENTAL ACADEMIC COMMITTEE / OFF-CAMPUSES ACADEMIC COMMITTEE**

1. Department / Off-Campus: Computer Science & Engineering				
Existing DAC				
Sl. No.	Name of Member	Designation	DAC Designation	
1.	HOD, CSE	Professor	Chairman (Ex-Office)	
2.	Dr. G.Sahoo	Professor	Member	
3.	Dr. (Mrs.) Vandana Bhattacharjee	Professor	Member	
4.	Dr. Sandip Dutta	Professor	Member	
5.	Dr. Kumar Rajnish	Associate Professor	Member	
6.	Dr. Abhijit Mustafi	Associate Professor	Member	
7.	Dr. B.K. Sarkar	Assistant Professor	Member	
8.	Dr. P.Paul	Assistant Professor	Member	
9.	Dr. Indrajit Mukherjee	Assistant Professor	Member	
10.	Dr. Srikanta Pal	Professor (ECE)	Member	
11.	Dr. C. Jeganathan	Professor (Remote Sensing)	Member	
12.	Guide(s) of the candidate			
Proposed DAC				
Sl. No.	Name of Member	Designation	DAC/AC Designation	Reason of change
1.	HOD, CSE	Professor	Chairman (Ex-Office)	
2.	Dr. (Mrs.) Vandana Bhattacharjee	Professor	Member	
3.	Dr. Sandip Dutta	Professor	Member	
4.	Dr. (Mrs.) Aruna Jain	Asso. Professor	Member	2 years rotation
5.	Dr. V.K. Jha	Asso. Professor	Member	
6.	Dr. (Mrs.) Itu Snigdh	Assistant Professor	Member	
7.	Dr. K.K. Senapati	Assistant Professor	Member	
8.	Dr. (Mrs.) Nisha Gupta	Professor, ECE	Member	
9.	Dr. (Mrs.) Sarbani Chakraborty (EEE)	Professor, EEE	Member	
10.	Guide (s) of the candidate			

2. Department: Production Engineering			
Existing DAC			
Sl. No.	Name of Member	Designation	DAC Designation
1.	HOD, Production	Associate Professor	CHAIRMAN (Ex-officio)
2.	Dr. S. K. Jha	Associate Professor	Member
3.	Dr. L.N. Pattaniak	Associate Professor	Member
4.	Dr. Ritesh Kr. Singh	Associate Professor	Member
5.	Dr. S.C. Srivastava	Associate Professor	Member
6.	Dr. Somak Datta	Assistant Professor	Member
7.	Dr. Bappa Acherjee	Assistant Professor	Member

	Dr. R.P. Sharma	Professor, Mechanical Engineering	Member	
9.	Dr. Utpal baul	Professor, Management	Member	
10	Guide (s) of the candidate			
Proposed DAC				
Sl. No.	Name of Member	Designation	DAC/AC Designation	Reason of change
1.	HOD, Production Engg.	Associate Professor	CHAIRMAN (Ex-officio)	
2.	Dr. S. K. Jha	Associate Professor	Member	
3.	Dr. L.N. Pattaniak	Associate Professor	Member	
4.	Dr. Ritesh Kr. Singh	Associate Professor	Member	
5.	Dr. J.Ghosh	Associate Professor	Member	Dr. S. C. Srivastava left the Institute.
6.	Dr. Somak Datta	Assistant Professor	Member	
7.	Dr. Bappa Acherjee	Assistant Professor	Member	
8.	Dr. R.P. Sharma	Professor, Mechanical Engineering	Member	
9.	Dr. Utpal baul	Professor, Management	Member	
10.	Guide (s) of the candidate		Member	

3. Department: BITEC-Noida

Existing DAC Committee				
Sl.No.	Name of Member	Designation in DAC		
1.	Dr. Asha Prasad Director, BIT Noida Campus	Chairman (Ex-Officio)		
2.	Dr. Vandna Sharma Associate Professor, BIT Noida Campus	Member		
3	Dr. Meenakshi Sharma Associate Professor, BIT Noida Campus	Member		
4.	Dr. Peeyush Teewary Associate Professor, BIT Noida Campus	Member		
5.	Dr. Suparna Datta Associate Professor, BIT Noida Campus	Member		
6.	Dr. Smitha Jha Assistant Professor, BIT Noida Campus	Ph.D Programme Coordinator		
7.	Dr. B. B. Sagar Assistant Professor, BIT Noida Campus	Member, and Ph.D Programme Associate coordinator		
8.	Dr. Shampa Chakarverty (Professor, NSUIT- Delhi)	External Member (CSE Field)		
9.	Dr. Sanjiv Mittal (Professor, IPU- Delhi)	External Member (Management Field)		
Proposed DAC Committee				
Sl.No.	Name of Member	Designation in DAC	Reason for Change	
1.	Dr. Asha Prasad Director, BIT Noida Campus	Chairman (Ex-Officio)	Tenure of the DAC Completed	
2.	Dr. Vandna Sharma Associate Professor, BIT Noida Campus	Member		

3	Dr. Meenakshi Sharma Associate Professor, BIT Noida Campus	Member	
4.	Dr. Ila Sahay Associate Professor, BIT Noida Campus	Member	
5.	Dr. Suparna Datta Associate Professor, BIT Noida Campus	Member	
6.	Dr. B. B. Sagar Assistant Professor, BIT Noida Campus	Member	
7.	Dr. Arun Mittal Assistant Professor, BIT Noida Campus	Member	
8.	Dr. Madhu Vij (Professor, FMS, DU, Delhi)	External Member (Management Field)	
9.	Dr. O. P. Verma (Professor, GBPEC, New Delhi)	External Member (CSE Field)	

4. Department /Off-capus : BITEC-Deoghar			
Existing DAC			
Sl. No.	Name of Members	Designation (DAC/AC)	
1.	Director, BITEC, Deoghar	Chairman (Ex-officio)	
2.	Prof Arbind Kumar, Prof. incharge Dept. of Mechanical Engg., BIT Deoghar	Member	
3.	Prof Vinay Sharma, Prof. incharge Dept. of Production Engg., BIT Deoghar	Member	
4.	Dr G Sahoo, Professor Dept. of CSE, BIT Mesra, Ranchi	Member	
5.	Dr Kamta Nath Mishra, I/C- Dept. of CSE, BIT Deoghar	Member	
6.	Prof Vijay Kr Jha, Professor, Dept. of CSE, BIT Mesra, Ranchi	Member	
7.	Dr Soumya Banerjee, I/C, Dept. of CSE, BIT Deoghar	Guide	
8.	Dr Ranjan Chattaraj, I/C, Dept of Mathematics, BIT Deoghar	Co-Guide	
Proposed DAC			
Sl. No.	Name of Members	Designation (DAC/AC)	Reason for change
1.	Director, BITEC, Deoghar	Chairman (Ex-officio)	As 1. Prof. G. Sahoo has superannuated. 2. Dr. Soumya Banerjee left the institute. 3. There are sufficient no. of faculty members having Ph.D. degree at BIT Deoghar, itself.
2.	Prof. Arbind Kumar, Dept. of Mechanical Engg., BIT Deoghar	Member	
3.	Prof. Vinay Sharma, Dept. of Production Engg., BIT Deoghar	Member	
4.	Dr. Sanjay Kumar, Associate Prof., Dept. of ECE, BIT Deoghar	Member	
5.	Dr. Kamta Nath Mishra, Assistant Prof., Dept. of CSE, BIT Deoghar	Member	
6.	Dr. Pankaj Mishra, Assistant Prof, Dept. of EEE, BIT Deoghar	Member	
7.	Dr. Amit Kumar, Assistant Prof., Dept. of Mathematics, BIT Deoghar	Member	

5. Department/ Centre : Remote Sensing, BIT, Mesra			
Existing Academic Committee			
Sl. No.	Name of Member	Designation (DAC/AC)	
1	HOD/In-Charge	Chairman (Ex-Officio)	
2	Dr. A.P. Krishna	Professor, DRS	
3	Dr. N. Patel	Professor, DRS	
4	Dr. C. Jeganathan	Professor, DRS	
5	Dr. V.S. Rathore	Assistant Professor, DRS	
6	Dr. Mili Ghosh	Assistant Professor, DRS	
7	Dr. A.K. Sinha	External Member, Professor, CEE	
8	Dr. D.J. Biswas	External Member, Professor, DArch.	
9	Guide(s) of the Candidate		
Proposed Academic Committee			Reason for Change
Sl. No.	Name of Member	Designation (DAC/AC)	
1	HOD/In-Charge	Chairman (Ex-Officio)	
2	Dr. A.P. Krishna	Professor, DRS	
3	Dr. N. Patel	Professor, DRS	
4	Dr. C. Jeganathan	Professor, DRS	
5	Dr. V.S. Rathore	Assistant Professor, DRS	
6	Dr. Mili Ghosh	Assistant Professor, DRS	
7	Dr. Richa N.K. Sharma	Assistant Professor, DRS	She has completed her Ph.d. Degree
8	Dr. Vandana Bhattacharya	External Member, Professor, CSE	Tenure of earlier members was completed.
9	Dr. K. Jayaram Kumar	External Member, Professor, PST	
10	Guide(s) of the Candidate		












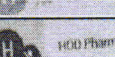

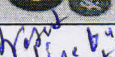
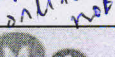




BIRLA INSTITUTE OF TECHNOLOGY

MESRA : RANCHI

104th SPECIAL ACADEMIC COUNCIL MEETING (Thru- Virtual Mode) (GOOGLE MEET)

Dated: 06.11.2020

ATTENDANCE SHEET

Sl.	NAME	DESIGN.	DEPARTMENT	As	SIGNATURE
1	Dr. Indranil Manna	VC	BIT	Chairman	<i>Indranil Manna</i> 6.11.20
2	Dr. Swapan Konar	Dean	FA&SR	Member	<i>Swapan Konar</i>
3	Dr. J.P. Pandey	CoE	Examination	Member	 J.P. Pandey
4	Dr. Utpal Baul	Dean	A&IR	Member	<i>Utpal Baul</i>
5	Mrs.(Dr.) P. Padmanabhan	Dean	AP	Member	<i>P. Padmanabhan</i>
6	Dr. Ananad Kr. Sinha	Dean	Students Welfare	Member	<i>Ananad Kr. Sinha</i>
7	Dr. Sandip Dutta	Dean	Admn. & Acad. Coord.	Member	<i>Sandip Dutta</i>
8	Dr. Satyaki Sarkar	Asso. Prof & HoD	Architecture	Member	 Satyaki Sarkar
9	Dr. Ramesh Chandra	Prof & HoD	Bio-Engineering	Member	 Ramesh Chandra
10	Dr. Gautam Sarkhel	Prof & HoD	Chemical Engg.	Member	 Gautam Sarkhel
11	Dr. P.K. Srivastava	Prof & HoD	Chemistry	Member	 PK Srivastava
12	Dr. Sudeshna Chakraborty	Prof & HoD	Civil & Env. Engg.	Member	 HOD Civil & Environmental Engineering
13	Mrs.(Dr.) V. Bhattacharjee	Prof & HoD	Comp. Sc. & Engg.	Member	 V Bhattacharjee
14	Dr. Srikanta Pal	Prof & HoD	ECE	Member	 Srikanta Pal
15	Dr. Shradha Shivani	Prof & HoD	Management	Member	 Shradha Shivani
16	Dr. Soubhik Chakraborty	Prof & HoD	Mathematics	Member	 HOD Mathematics
17	Dr. R.P. Sharma	Prof & HoD	Mechanical Engg.	Member	 HOD Mechanical Engineering
18	Dr. Subir Samanta	Prof & HoD	Pharm. Sc. & Tech.	Member	 HOD Pharmaceutical Sciences & Tech.
19	Dr. (Mrs.) Sunita Keshri	Prof & HoD	Physics	Member	 S Keshri
20	Dr. C. Jeganathan	Prof & HoD	Remote Sensing	Member	<i>Present online but not complete</i>
21	Dr. Mohan Varma	Prof & Head	SE&R	Member	 Mohan Varma
22	Dr. Sanjay K. Jha	Asso. Prof. & Head	Production Engg.	Member	 Sanjay Kr Jha
23	Dr. Nishikant Kumar	Incharge	HMCT	Member	 HOD Health Management & Catering
24	Dr. (Mrs.) M. Chakraborty	Prof.	Architecture	Member	 Manjan Chakraborty
25	Dr. D.J. Biswas	Prof	Architecture	Member	 DJ Biswas
26	Dr. Rakesh Kumar Sinha	Prof.	Bio-Engineering	Member	 Rakesh Sinha
27	Dr. Kunal Mukhopadhyay	Prof.	Bio-Engineering	Member	<i>Kunal Mukhopadhyay</i>
28	Dr. (Mrs.) Sudipta Goswami	Prof.	Chemical Engg.	Member	

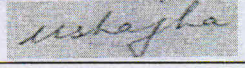




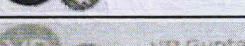

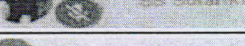
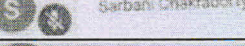
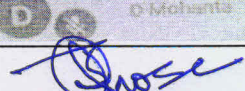
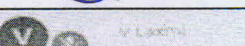


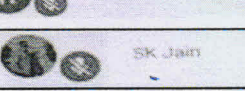

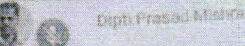
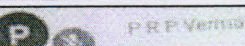
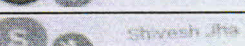

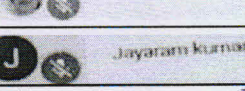

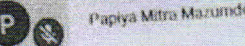
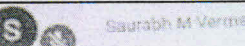


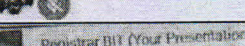
BIRLA INSTITUTE OF TECHNOLOGY

MESRA : RANCHI

104th SPECIAL ACADEMIC COUNCIL MEETING (Thru- Virtual Mode) (GOOGLE MEET)

Dated: 06.11.2020

ATTENDANCE SHEET

Sl.	NAME	DESIGN.	DEPARTMENT	As	SIGNATURE
29	Dr. (Mrs.) Usha Jha	Prof.	Chemistry	Member	
30	Dr. Birendra Kr. Singh	Prof.	Civil & Env. Engg.	Member	
31	Dr. (Mrs.) Bindhu Lal	Prof.	Civil & Env. Engg.	Member	
32	Dr. (Mrs.) Nisha Gupta	Prof.	ECE	Member	
33	Dr. S.K. Ghorai	Prof.	ECE	Member	
34	Dr. Vibha Rani Gupta	Prof.	ECE	Member	
35	Dr. S.S. Solanki	Prof.	ECE	Member	
36	Dr. Sarbani Ray Chakraborty	Prof.	EEE	Member	
37	Dr. D.K. Mohanta	Prof.	EEE	Member	
38	Dr. T. Ghosh	Prof.	EEE	Member	
39	Dr. (Ms.) Vijaya Laxmi	Prof.	EEE	Member	
40	Dr. (Mrs.) Manju Bhagat	Prof.	Management	Member	
41	Dr. R.N. Bhagat	Prof.	Management	Member	
42	Dr. S.K. Jain	Prof.	Mathematics	Member	
43	Dr. Seshadev Padhi	Prof.	Mathematics	Member	
44	Dr. Dipiti Pd. Mishra	Prof.	Mechanical Engg.	Member	
45	Dr. P.R.P. Verma	Prof.	Pharm. Sc. & Tech.	Member	
46	Dr. Shiveshwar Jha	Prof.	Pharm. Sc. & Tech.	Member	
47	Dr. (Ms.) Swastika Ganguly	Prof.	Pharm. Sc. & Tech.	Member	
48	Dr. K. Jayaram Kumar	Prof.	Pharm. Sc. & Tech.	Member	
49	Dr. B.N. Sinha	Prof.	Pharm. Sc. & Tech.	Member	
50	Dr. (Mrs.) Papiya M. Mazumder	Prof.	Pharm. Sc. & Tech.	Member	
51	Dr. (Mrs.) S.M. Verma	Prof.	Pharm. Sc. & Tech.	Member	
52	Dr. Sanjay Kumar Sinha	Prof.	Physics	Member	
53	Dr. Sanjeeb Kr. Rout	Prof.	Physics	Member	
54	Dr. Akhouri P. Krishna	Prof.	Remote Sensing	Member Secretary	
55	Dr. Nilanchal Patel	Prof.	Remote Sensing	Member	

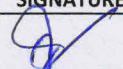











BIRLA INSTITUTE OF TECHNOLOGY

MESRA : RANCHI

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Dated: 06.11.2020

ATTENDANCE SHEET

Sl.	NAME	DESIGN.	DEPARTMENT	As	SIGNATURE
56	Dr. Sudip Das	Prof	SE&R	Member	
58	Dr. S.S. Solanki	Director	University Polytechnic	Member	 SS Solanki
59	Dr. R.C. Jha	Director	Director Off-campus, Deoghar	Invitee	 RC Jha
60	Dr. Vinay Sharma	Prof.	Director Off-campus, Deoghar	Invitee	 Vinay A
61	Dr. Arbind Kumar	Prof.	Director Off-campus, Deoghar	Invitee	 Arbind Kumar
62	Dr. Asha Prasad	Director (In-charge)	Director Off-campus, Noida	Invitee	 Director Noida
63	Dr. A.N. Jha	Director (In-charge)	Director(l/c) Off-campus, Ialpur	Invitee	 Amarnath Jha
64	Dr. Arbind Kumar	Director (Acting)	Director Off-campus, Patna	Invitee	 Arbind Kumar
65	Dr. Balram Singh	Prof.	Director Off-campus, Patna	Invitee	
66	Dr. Rajeev Ranjan Sahay	Prof.	Director Off-campus, Patna	Invitee	
67	Dr. Shree Prakash Lal	Prof.	Director Off-campus, Patna	Invitee	 S P Lal
68	Dr. Abhinav Dinesh	Director	Director Off-campus, Jaipur	Invitee	 Abhinav Dinesh
69	Dr. Ganesh Prasad Mishra	Prof.	Director Off-campus, Jaipur	Invitee	 GP Mishra
70	Dr. Roopali Sharma	Prof.	Director Off-campus, Jaipur	Invitee	 Roopali Sharma
71	Dr. Krishna Mohan Medicherla	Prof.	Director Off-campus, Jaipur	Invitee	

Annexure - I



BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI

Ref.: Dean(AP)/2020-21/18

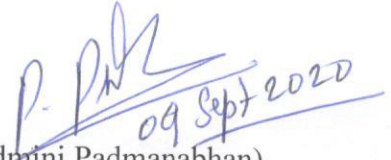
Date: 09/09/2020

Sub: - Assessment & Adjustments Policy for Examinations (MO 20) - COVID 19

Dear Sir/Madam,

Please find enclosed the 'Assessment and Examinations Adjustment Policy - COVID 19' for implementation in the MO 20 semester. It may please be noted that MO 20 semester will continue through distant education in lieu of conventional physical class room teaching mode.

By order of the Vice-Chancellor


(Dr. Padmini Padmanabhan)
Dean (Academic Programme)

Copy to:

1. Deans/CoE/Director IQAC
2. HoDs of Academic Departments/Directors/Incharge Off-campuses
3. Registrar
4. Prof. Incharge-ERP
5. PS to Vice Chancellor
6. File

Encl.: As above

ASSESSMENTS & ADJUSTMENTS POLICY FOR
EXAMINATIONS (MO 20) – COVID 19



BIRLA INSTITUTE OF TECHNOLOGY

(A Deemed to be University u/s 3 of UGC Act)

MESRA, RANCHI – 835215 Jharkhand India

P. P. P.
09 Sept 2020

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Clause No.	Descriptions	Page No.	
1.	Policy Statement	1	
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	2.1.1		Distribution of marks under PE for CBCS Courses
	2.1.2		Distribution of marks under PE for Non CBCS Courses
	2.2		Laboratory / Sessional Classes (L/S) – under CBCS and Non- CBCS
	2.3		Semester End Examinations
	2.4		Ph.D. Programme Evaluations
	2.4.1		Course work
	2.4.2		Term papers
	2.4.3		Pre Ph.D. presentations & Ph.D. viva voce examinations

1. POLICY STATEMENT

Birla Institute of Technology (BIT), Mesra, Ranchi recognises the extraordinary circumstances our students and staff are experiencing because of the COVID-19 Pandemic. The Institute is continuing to support student learning through these unprecedented conditions.

The Institute is making amendments to the following policies and procedures to support students and staff during the COVID-19 period and will be in force until the pandemic situation eases:

1. UG / PG Regulations 2011
2. UG/ PG Ordinances 2018 for CBCS
3. Examination Regulations -2018

As a general principle, provisions in the above-mentioned institute policies that provide support for students during periods of family calamity under compassionate circumstances still apply. Under the compassionate clause special consideration is given to the students for absence from classes. Mandatory attendance of 75% is waived off for those students considered under compassionate clause. Compassionate circumstances may include for example instances where a student has faced family calamity (ex: bereavement leave upon the incidence of demise of father/mother/guardian). Under COVID-19 circumstances, compassionate clause is extended to include severe internet connectivity issues (Ex: connectivity issues faced due to nature disaster like flood etc). The adjustments in this policy will supersede the provisions outlined in the above policies under UG / PG Regulations 2011 and UG/ PG Ordinances 2018 for CBCS

Where there is no mention to a specific provision of a policy or procedure, it is taken to mean the provision of that policy or procedure is still applicable during the COVID-19 period.

2. ASSESSMENT & ADJUSTMENTS POLICY

The following adjustments apply to the Assessment Policy for the period covering the COVID-19 pandemic:

2.1. Progressive Evaluation (PE) for PG/UG programme of Theory Courses

- a) PE weightage of marks for CBCS is 50 % as per UG/ PG Ordinances 2018 for CBCS and 40% as per UG / PG Regulations 2011 under Non-CBCS will continue.
- b) **Assessment modifications in the view of COVID-19:** – Any type of traditional examination (pen-paper based) conducted usually in Institute campus under PE including Midterm examinations, Quiz/ s shall stand withdrawn. However, evaluation tests in the form of online written quiz/s, online objective type test/s will be conducted. Assessment shall be done at

P.P.K.
09 Sept 2020

the end of each module, on the completion of a module for both CBCS and Non- CBCS. Assessment date shall be announced by the concerned faculty at least in three (3) days in advance. It shall be a formal assessment and shall supersede the assessment activities mentioned in the Academic Schedule released for MO 2020. Assignments shall be in exclusion of module tests/quizzes.

- 2.1.1. Distribution of marks under PE for CBCS Courses:** The marks under PE shall be equally distributed (10%) for each module in the case of CBCS. Further division of marks of 10% for each module shall be among quiz/s, assignments / seminar / group discussions / limited duration online written / Objective type test (*short duration not exceeding 30 minutes*). The same shall be determined by the teaching faculty of the course as to suit the nature of the module in terms of depth, subject nature of course taught. Apart from the formal assessments a faculty may choose to hold surprise test /s as per his/ her preference.
- 2.1.2. Distribution of marks under PE for Non CBCS Courses:** In the case of non-CBCS, the distribution of PE marks (40%) across 7 modules shall be determined by the faculty teaching the course and the same shall be approved by the HoD for each course independently. The distribution of marks among various modules shall be to suit the nature of the module in terms of depth, subject nature of the course taught. The assessments shall be among quiz/s, assignments / seminar / group discussions / limited duration online written / Objective type test (*short duration not exceeding 30 minutes*). Apart from the formal assessments a faculty may choose to hold surprise test /s as per his/ her preference.

The HoD shall maintain a course file duly approved and signed by him/her for the PE distribution of marks individually for each course of non- CBCS and CBCS.

Every teaching faculty shall inform the students about the PE distribution of marks for both CBCS and Non- CBCS at the beginning of the current semester of MO2020.

2.2. Laboratory / Sessional Classes (L/S) – under CBCS and Non- CBCS

Registration to L/S for MO 2020 will be made in the usual manner, but the classes shall be conducted after the conclusion of theory classes and physically in the institute laboratories during MO2020 itself if the normality would resume and students return to the campus. If not, the same shall be conducted in the following session of SP2021, the schedule of which shall be announced at the appropriate time and as deemed fit by the institution.

2.3. Semester End Examinations:

The institute will announce polices to conduct semester end examination when it is deemed fit and appropriate.


09 Sept 2020

2.4. Ph.D. Programme Evaluations:

- 2.4.1. Course work:** There shall not be any course work registration for newly admitted scholars of Ph.D. programme in MO 2020 / continuing scholars of Ph.D. programme. The course registration for Ph.D. scholars shall resume after the resumption of normal conditions.
- 2.4.2. Term papers:** Term paper presentations and assessments which can be conducted online (through google meet or Microsoft teams) shall continue to be held.
- 2.4.3. Pre Ph.D. presentations & Ph.D. viva voce examinations:** Pre Ph.D. presentations & Ph.D. viva voce examinations and assessments which can be conducted online (through Google meet or Microsoft teams) shall continue to be held.


09 Sept 2020





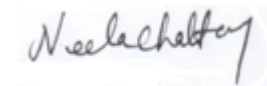
Annexure - II



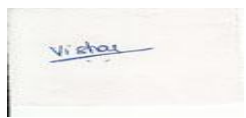

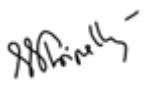




DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING






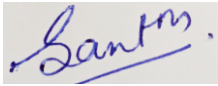
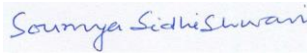
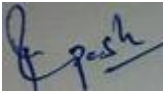
BIRLA INSTITUTE OF TECHNOLOGY, MESRA: RANCHI

Minutes of the Departmental Meeting (DM) meeting held on 21 October 2020

Departmental Meeting was held on 21 October 2020 at 11:30 a.m. through google meet. All the faculty members of the department were called for the meeting.

Sl. No.	Name	Designation	Signature
1.	Dr. S. Pal (Ex-officio chairman)	Professor	
2.	Dr. R. Sukesh Kumar	Professor	
3.	Dr. S. K. Ghorai	Professor	
4.	Dr. (Mrs.) Nisha Gupta	Professor	
5.	Dr. (Mrs.) V.R. Gupta	Professor	
6.	Dr. S. S. Solanki	Professor	
7.	Mr. B. B. Pal	Associate Professor	
8.	Dr. (Mrs.) N. Chattoraj	Associate Professor	
9.	Dr. V. Nath	Associate Professor	

10.	Dr. Aminul Islam	Associate Professor	
11.	Dr. K. Mahto	Assistant Professor	
12.	Mr. Vishal H. Shah	Assistant Professor	
13.	Dr. Janardan Sahay	Assistant Professor	
14.	Dr. Sanjeet Kumar	Assistant Professor	
15.	Dr. S. S. Tripathy	Assistant Professor	
16.	Mr. S. K. Dash	Assistant Professor	
17.	Dr. S. S. Sahu	Assistant Professor	
18.	Dr. M. K. Mukul	Assistant Professor	
19.	Dr. G. K. Mishra	Assistant Professor	
20.	Dr. Somnath Sengupta	Assistant Professor	

21.	Dr. Priyank Saxena	Assistant Professor	
22.	Dr. (Mrs.) Swati Prasad.	Assistant Professor	
23.	Dr. D. K. Upadhyay	Assistant Professor	
24.	Dr. A. K. Tiwary	Assistant Professor	
25.	Dr. (Mrs.) P. P. Dash	Assistant Professor	
26.	Mr. Santashrya Prasad	Assistant Professor	
27.	Dr. (Mrs.) S Sidhishwari	Assistant Professor	
28.	Dr. Rupesh Kumar Sinha	Associate Lecturer	

The Head of the department, based on the discussions of all faculty members & HoD with our honorable Vice Chancellor on 9th October 2020 on **Target 25** and moreover VC's sharing of his visionary recommendation with the HEAD of the department on the issue of CBCS and on

implementation or adoption of newly suggestible NEP guidelines based course structure and syllabus as recommended by AICTE, the Central Authority, on exploring the feasibility of offering **fewer number of PG courses with maximum feasible intake capacity** by the ECE department and VC Sir also insisted to have offer degree certificates in the name of '***Masters of Electronics & Communication Engineering with the name of the Specialization***'. Hod also stressed upon the fact that the department has to send its recommendation to Dean (AP) for inclusion in the Academic Council Meeting for detailed discussion and deliberation.

The Head of the Dept., Dr. S. Pal put forward the following agenda in the meeting before the faculty members:

A) Finalization of following **two new PG programmes with maximum capacity of 54 students in each specialization.**

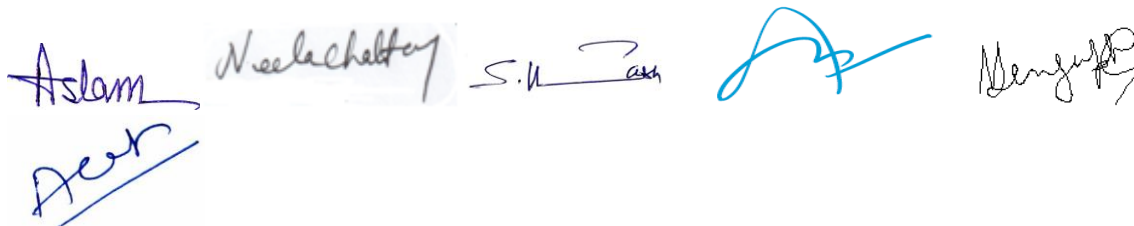
(1) *Microelectronics & Embedded Systems*

(2) *Wireless Communication & RF Systems*

As recommended, HoD detailed about some relevant guidelines for recommendation about the new courses (based on NEP guidelines) to be offered:

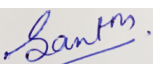
a) Theory and Laboratory courses of 1st semester will be common for both the PG programmes. 50% of the Theory and Laboratory courses of 2nd semester will be common for both the PG programmes. Left over 50% of the Theory and Laboratory courses of 2nd semester will be specialization specific.

b) 3rd and 4th semester (entire 2nd year) should have only project / thesis credits and selection of project and guide should entirely depend upon based on the choice received from the students.

The image shows five handwritten signatures in blue ink, arranged horizontally. From left to right: 1. 'Aslam' with a horizontal line underneath. 2. 'Neelachetty' with a horizontal line underneath. 3. 'S. K. Ash' with a horizontal line underneath. 4. A stylized signature that appears to be 'S. Pal'. 5. A signature that appears to be 'Mangal'.

  
Jeeva

88Dinally Pal abileep

Soumya Sidki Shwari 

Vgupte

Sahu

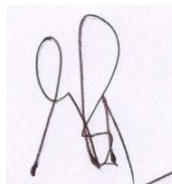
Abolank

ferasad

Choudhary

All the faculty members of the department unanimously recommend offering the above mentioned new PG programmes with intake of 54 in each specialization. Faculty members also reiterated that this was one of the points sent from the department for Target 25. After detailed deliberation on the agenda, above stated resolutions were recommended/approved by the department and to be sent to Dean Admission & Academic Coordination office for further follow up action after receiving approval from the Academic Council:

The meeting closed at 12:55 p.m.



(Dr. S. Pal)

(Professor and head)



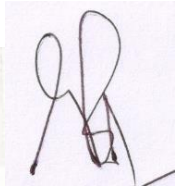
Copy to:

- (a) Dean (AP)
- (b) P.S. to Vice Chancellor

Aslam

Neelechetay

Sounya Sidhi Shwari



S. H. _____

_____ ferasad.

Santm.

Opal

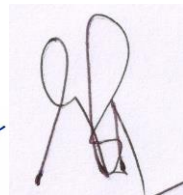
Sahy Abolank.

Mengjud

abilet



Acn



Annexure - III

To,

Date: 19.10.2020

The Dean (AP)

BIT, Mesra

Sub: Proposal for closure of M.Tech Chemical Engg to Academic Council Meeting

Dear Madam,

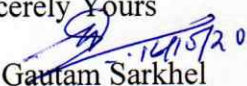
With reference to mail received from Director IQAC regarding AICTE unapproved M Tech – Chemical Engineering programme, The faculty committee and DAC discussed the issue related to deficiency of the requirements of the programme with respect to specialized faculty and PG lab facilities, for which it did not get approval from AICTE. The both the committee recommend once we fulfil the requirement, Department will go for fresh approval procedure in next academic year for M.Tech – Chemical Engineering or allied branch.

Under these circumstances both the committees decided to recommend closure of the unapproved MTech – Chemical Engineering Programme.

Please find attached minutes of faculty and DAC meeting.

Thanking you

Sincerely Yours


Dr. Gautam Sarkhel
Professor & Head
Department of Chemical Engineering
Birla Institute of Technology, Mesra
Ranchi-835215

Birla Institute of Technology, Mesra, Ranchi

Minutes of DAC Meeting

Date: 15/10/2020

With reference to mail received from Director IQAC regarding AICTE unapproved M Tech - Chemical Engineering programme, The DAC discussed the issue related to deficiency of requirements of the programme with respect to specialized faculty and PG lab facilities, for which it did not get approval from AICTE. The committee recommend once we fulfil the requirement, Department will go for fresh approval procedure in next academic year for M.Tech - Chemical Engineering or allied branch.

Under this circumstances DAC decided to recommend closure of the unapproved MTech - Chemical Engineering Programme.

Attends online

Dr. (Mrs.) S. Goswami, Professor

AKSen

Dr. Akhil Kumar Sen, Associate Professor

Dr. Pulak Datta, Assistant Professor

S. P. Mohanraj

Dr. G T Mohanraj

Anand Bharti
15.10.2020

Dr. Anand Bharti (Invited Member)

Dipti Prasad Mishra

Dr. Dipti Prasad Mishra, Professor, Dept. of Mechanical Engg

Sudip Das
15/10/20

Dr. Sudip Das, Professor, Department of Space Engg. & Rocketry

Gautam Sarkhel
15/10/20

Dr. Gautam Sarkhel

(HOD, Chemical Engineering)



HOD Chemical Engineering <hod.chemical@bitmesra.ac.in>

Re: Invitation: DAC meeting for MTech Chemical Engg @ Thu Oct 15, 2020 11am - 12pm (IST) (sdptgoswami@bitmesra.ac.in)

1 message

Sudipta goswami <sdptgoswami@bitmesra.ac.in>
To: HOD Chemical Engineering <hod.chemical@bitmesra.ac.in>

Sat, Oct 17, 2020 at 3:44 PM

I agree with the decision taken by all the members of the meeting held on 15th October, 2020 regarding closure of M. Tech Chemical Engg. Programme of department of Chemical Engg.
S. GOSWAMI

On Wed, 14 Oct 2020, 12:05 pm , <hod.chemical@bitmesra.ac.in> wrote:

You have been invited to the following event.**DAC meeting for MTech Chemical Engg**

When Thu Oct 15, 2020 11am – 12pm India Standard Time - Kolkata

[more details »](#)Joining info Join with Google Meet
meet.google.com/xcn-kywq-wgkJoin by phone
(US) +1 423-735-3112 (PIN: 178620169)

Calendar sdptgoswami@bitmesra.ac.in

Who

- hod.chemical@bitmesra.ac.in - organizer
- dpmishra@bitmesra.ac.in
- sdptgoswami@bitmesra.ac.in
- abharti@bitmesra.ac.in
- pulakdatta@bitmesra.ac.in
- gautamsarkhel@bitmesra.ac.in
- sudipdas@bitmesra.ac.in
- gtmohanraj@gmail.com

Going (sdptgoswami@bitmesra.ac.in)? **Yes - Maybe - No** [more options »](#)

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Department of Chemical Engineering
Birla Institute of Technology, Mesra, Ranchi

Minutes of Departmental Faculty Meeting

Date: 09/10/2020

With reference to mail received from Director IQAC regarding AICTE unapproved M Tech – Chemical Engineering programme, The committee discussed the issue related to deficiency of the requirements of the programme with respect to specialized faculty and PG lab facilities, for which it did not get approval from AICTE. The committee recommend once we fulfil the requirement, Department will go for fresh approval procedure in next academic year for M.Tech – Chemical Engineering or allied branch.

Under this circumstances Departmental committee decided to recommend closure of the unapproved MTech – Chemical Engineering Programme.

A. Goswami
Attended online

Dr. S Goswami

A. K. Sen
Dr. A K Sen

S. K. Jana
Dr. S K Jana

J. Sudeepan
Dr J Sudeepan

G. T. Mohanraj
Dr. G T Mohanraj

B. Ruidas
Dr. B Ruidas

A. Tiwary
Dr. A Tiwary

A. Roy
Dr. A Roy

A. Karmakar
Dr A Karmakar

P. Dutta
Dr. P Dutta

A. N. Mishra
Dr. A N Mishra

D. Ghosh
Mrs D Ghosh

A. Choudhury
Dr A Choudhury

A. Bharti
Dr A Bharti

Y. Prajapati
Dr Y Prajapati

A. Barnawal
Dr A Barnawal

G. Sarkhel
Dr. Gautam Sarkhel,

(HOD, Chemical Engineering)



Gautam Sarkhel <gautamsarkhel@bitmesra.ac.in>

Invitation: DAC meeting for MTech Chemical Engg @ Thu Oct 15, 2020 11am - 12pm (IST) (gautamsarkhel@bitmesra.ac.in)

1 message

hod.chemical@bitmesra.ac.in <hod.chemical@bitmesra.ac.in>

Wed, Oct 14, 2020 at 12:05 PM

Reply-To: hod.chemical@bitmesra.ac.in

To: gautamsarkhel@bitmesra.ac.in, dpmishra@bitmesra.ac.in, sdptgoswami@bitmesra.ac.in, abharti@bitmesra.ac.in, pulakdatta@bitmesra.ac.in, sudipdas@bitmesra.ac.in, gtmohanraj@gmail.com

You have been invited to the following event.

DAC meeting for MTech Chemical Engg

When Thu Oct 15, 2020 11am – 12pm India Standard Time - Kolkata

[more details »](#)

Joining info Join with Google Meet
meet.google.com/xcn-kywq-wgk

Join by phone
(US) +1 423-735-3112 (PIN: 178620169)

Calendar gautamsarkhel@bitmesra.ac.in

Who

- hod.chemical@bitmesra.ac.in - organizer
- dpmishra@bitmesra.ac.in
- sdptgoswami@bitmesra.ac.in
- abharti@bitmesra.ac.in
- pulakdatta@bitmesra.ac.in
- gautamsarkhel@bitmesra.ac.in
- sudipdas@bitmesra.ac.in
- gtmohanraj@gmail.com

Going (gautamsarkhel@bitmesra.ac.in)? **Yes - Maybe - No** [more options »](#)

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Gautam Sarkhel <gautamsarkhel@bitmesra.ac.in>

Invitation: Faculty Meeting- MTech Chemical Engg @ Fri Oct 9, 2020 10am - 11am (IST) (gautamsarkhel@bitmesra.ac.in)

1 message

hod.chemical@bitmesra.ac.in <hod.chemical@bitmesra.ac.in>

Thu, Oct 8, 2020 at 12:35 PM

Reply-To: hod.chemical@bitmesra.ac.in

To: gautamsarkhel@bitmesra.ac.in, arnabkarmakar@bitmesra.ac.in, amar.mishra20@bitmesra.ac.in, arup@bitmesra.ac.in, anupamroy@bitmesra.ac.in, atiwari@bitmesra.ac.in, dghosh@bitmesra.ac.in, sumitkrjana@bitmesra.ac.in, dbahadur.teqip@bitmesra.ac.in, bidhanruidas@bitmesra.ac.in, akhilsen@bitmesra.ac.in, akb@bitmesra.ac.in, ynprajapati@bitmesra.ac.in, sdptgoswami@bitmesra.ac.in, abharti@bitmesra.ac.in, gtmohanraj@bitmesra.ac.in, pulakdatta@bitmesra.ac.in, sudeepan@bitmesra.ac.in, nirupama@bitmesra.ac.in, ravigvemula@bitmesra.ac.in

You have been invited to the following event.**Faculty Meeting- MTech Chemical Engg**

When Fri Oct 9, 2020 10am – 11am India Standard Time - Kolkata

[more details »](#)

Joining info Join with Google Meet
meet.google.com/iuw-hiec-dvu

Join by phone
(US) +1 443-584-5085 (PIN: 102101193)

Calendar gautamsarkhel@bitmesra.ac.in

Who

- hod.chemical@bitmesra.ac.in - organizer
- arnabkarmakar@bitmesra.ac.in
- amar.mishra20@bitmesra.ac.in
- arup@bitmesra.ac.in
- anupamroy@bitmesra.ac.in
- atiwari@bitmesra.ac.in
- dghosh@bitmesra.ac.in
- sumitkrjana@bitmesra.ac.in
- dbahadur.teqip@bitmesra.ac.in
- bidhanruidas@bitmesra.ac.in
- gautamsarkhel@bitmesra.ac.in
- akhilsen@bitmesra.ac.in
- akb@bitmesra.ac.in
- ynprajapati@bitmesra.ac.in
- sdptgoswami@bitmesra.ac.in
- abharti@bitmesra.ac.in
- gtmohanraj@bitmesra.ac.in
- pulakdatta@bitmesra.ac.in
- sudeepan@bitmesra.ac.in
- nirupama@bitmesra.ac.in
- ravigvemula@bitmesra.ac.in

Going (gautamsarkhel@bitmesra.ac.in)? **Yes - Maybe - No** [more options »](#)

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BIT Webmail Mail - Invitation: Faculty Meeting- MTech Chemical Engg @ Fri Oct 9, 2020 10am - 11am (IST) (gautamsarkhel@bitmesra.ac.in)

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Annexure - IV



DEPARTMENT OF ARCHITECTURE
BIRLA INSTITUTE OF TECHNOLOGY
(Deemed University u/s 3 of UGC Act 1956)
Mesra, Ranchi – 835215

05.08.2019

Minutes of the Meeting

A faculty meeting was conducted on 05.08.2019 at Departmental Resource Centre. The meeting was attended by faculty members of the department. The following aspects were discussed and concluded upon:

- As per the Notice of the Dean FA&SR dated 05/08/2019, regarding Faculty recruitment / promotion, the members decided that as per COA (for B.Arch) and AICTE (for MUP) guidelines there is a **deficiency of 2 (two) Associate Professors in the Department**. Hence advertisement should be made for internal promotion of two faculty members in the department.
- As per Office order ITPI/BITM/2018-19 dated 20th July, the Institute of Town Planners India have given their No-Objection towards **increase of seats for Masters in Urban Planning Programme from 12 to 18**. The house decided to accept it and forward it to Departmental Policy Committee for further course of action.
- The name of the Department as it currently exists is Department of Architecture. Seeing the continuous increase in admission in Masters in Urban Planning course, the faculty members again reiterated its stand to **change the name of the department to "Department of Architecture and Planning"**.

Prof. Satyaki Sarkar

Prof. Smriti Mishra

Prof. Mrina Pathak

Prof. Anjali Pathak

Prof. Manjari Chakraborty

Prof. Bimal Chandra Roy

Prof. Apurv Ashish

Prof. Rizwan Kazmi

Prof. D.J. Biswas

Prof. R.C. Sinha

Prof. Anila Surin

Prof. Ritu Agrawal

Prof. Anuj Toppo

Prof. Pawan Tiwari

Prof. Shama Parween



DEPARTMENT OF ARCHITECTURE
BIRLA INSTITUTE OF TECHNOLOGY
(Deemed University u/s 3 of UGC Act 1956)
Mesra, Ranchi – 835215

07.08.2019

Minutes of the Meeting

A Departmental Policy Committee meeting was conducted on 06.08.2019 at the office of the Head of the Department. The following aspects were discussed and concluded upon:

- As per the Notice of the Dean FA&SR dated 05/08/2019, regarding Faculty recruitment / promotion, the members decided that as per COA (for B.Arch) and AICTE (for MUP) guidelines there is a **deficiency of 2 (two) Associate Professors in the Department**. Hence advertisement should be made for internal promotion of two faculty members in the department.
- As per Office order ITPI/BITM/2018-19 dated 20th July, the Institute of Town Planners India have given their No-Objection towards **increase of seats for Masters in Urban Planning Programme from 12 to 18**. The house decided to accept it and forward it to Departmental Policy Committee for further course of action.
- The name of the Department as it currently exists is Department of Architecture. Seeing the continuous increase in admission in Masters in Urban Planning course, the faculty members again reiterated its stand to **change the name of the department to "Department of Architecture and Planning"**.

Sarkar 7/8/19

Prof. Satyaki Sarkar
(Assoc. Prof & Head Arch)

Smriti Mishra 7/08/19

Prof. Smriti Mishra
(Asst. Prof Architecture)

Manjari Chakraborty 7/8/19

Prof. Manjari Chakraborty
(Professor Architecture)

Roy 07/08/19

Prof. Indrajit Roy
(Assoc. Prof CEE)

D.J. Biswas 7/8/19

Prof. D .J. Biswas
(Professor Architecture)

R.N.K. Sharma 7/8/19

Prof R.N.K. Sharma
(Asst. Prof. Remote Sensing)



DEPARTMENT OF ARCHITECTURE
BIRLA INSTITUTE OF TECHNOLOGY
(Deemed University u/s 3 of UGC Act 1956)
Mesra, Ranchi – 835215

Date: 13/09/2019

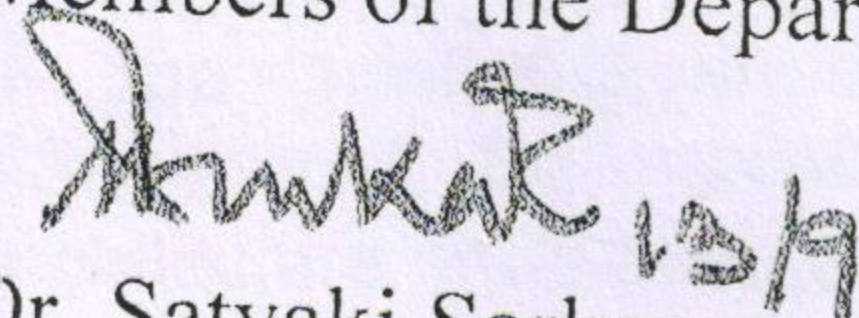
Minutes of the meeting of Board of Studies

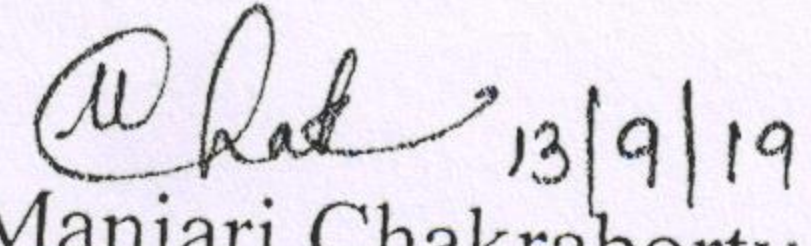
A meeting of the Members of the Board of Studies (BOS) was conducted on 13.09.2019. The members discussed the agendas related to increase in MUP admission from academic year 2020-21 and name change of the department. The following are the resolutions of the meeting:

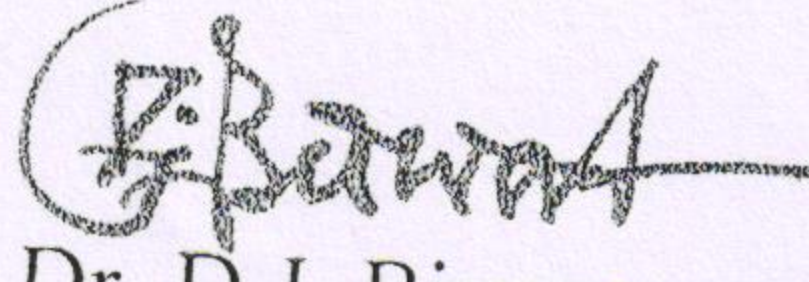
- The course of Masters in Urban Planning in Mesra campus is currently experiencing full admission since last few academic sessions. The Department has applied to its approving institution Institute of Town Planner India for increase in intake from next academic session. As per Office order ITPI/BITM/2018-19 dated 20th July 2019, the Institute of Town Planners India have given their No-Objection towards **increase of seats for Masters in Urban Planning Programme from 12 to 18**. The house decided to accept it with a resolution to increase the intake from 2020-21 academic session.
- The name of the Department as it currently exists is Department of Architecture. Seeing the continuous increase in admission in Masters in Urban Planning course, and as per advice of the Institute of Town Planner, India the members again reiterated its stand to **change the name of the department to "Department of Architecture and Planning" at Mesra campus.**

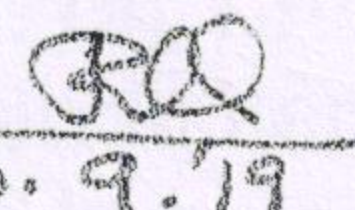
The members of the committee discussed the issue and decided to forward the same to Academic Council for approval.

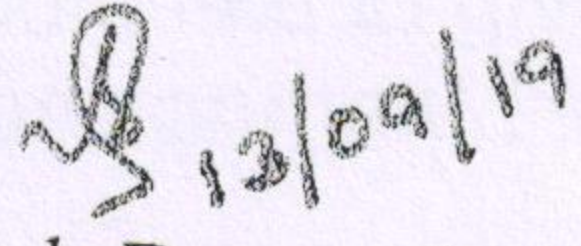
Members of the Departmental Board of Studies

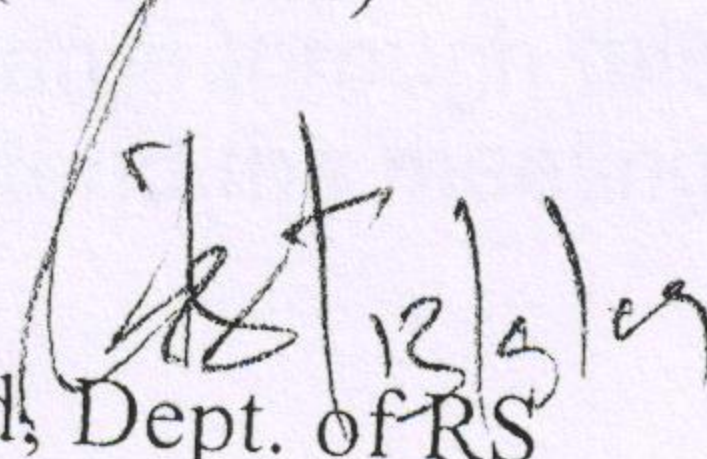

Dr. Satyaki Sarkar
Assoc. Pro & Head
(Ex-officio Chairman)


Dr. Manjari Chakraborty
Professor, Architecture
(Member)


Dr. D.J. Biswas
Professor, Architecture
(Member)


13.9.19
Prof. Ritu Agrawal
Asst. Prof, Architecture
(Member)


13/09/19
Head, Dept. of CEE,
BIT Mesra
(Member)


13/9/19
Head, Dept. of RS
BIT Mesra
(Member)

(Approval obtained through email)
In-Charge, Dept. of Architecture
BIT Patna (Member)

In-Charge, Dept. of Architecture
BIT RAK (Member)

(Approval obtained through email)
Dr. Swati Saha, Professor, IEST Shibpur
(External Member)

(Approval obtained through email)
Ar. Sandeep Jha, AXIS, Ranchi
(External Member)

Annexure - V

In-depth Specialization in Geotechnical Engineering

Students who have registered for **B. Tech in Civil Engineering** should complete 20 credits, opting courses listed below. The credits shall be over and above the minimum requirement for degree award. Courses shall be selected from single specialization area only.

Semester/Session of study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery & Credits			Total Credits C – Credits
					L	T	P	
Fifth (Monsoon)	Third	Theory						
		DS	CE321	Environment & Geotechnics	3	0	0	3
			CE322	Rock Mechanics & Geology	3	0	0	4
		Total						
Sixth (Spring)	Third	Theory						
		DS	CE323	Ground Engineering	4	0	0	4
			CE324	Geotechnics & Earthquakes	3	0	0	3
		Sessional						
		DS	CE325	Soil Engineering Software Lab	0	0	4	2
Total							9	
Seventh (Monsoon)	Fourth	Theory						
		DS	CE419	Advanced Geotechnical Engineering	3	0	0	3
		Sessional						
DS	CE433	Technical Seminar	0	0	2	1		
Total							4	
Grand Total (Minimum requirement for in-depth specialization award)							20	

COURSE INFORMATION SHEET

Course code: CE321

Course title: ENVIRONMENT & GEOTECHNICS

Pre-requisites: 1. Geotechnical Engineering. 2. Environmental Engineering

Co- requisites: Nil

Credits: 3 L: 3 T:0 P: 0

Class schedule per week: 03

Class: B.E.

Semester / Level: Level 3

Branch: B.E. Civil Engineering with specialization in Soil Mechanics & Foundation Engineering

Course Objectives

This course enables the students:

1	To know about the fundamentals of Geo-environmental Engineering
2	To have thorough knowledge of clayey soil minerals and bonds and factors affecting geoenvironmental problems
3	To have a thorough knowledge on soil water interaction and contamination
4	To study about waste containment system
5	To know about the various remediation methods of a contaminant site

Course Outcomes

After the completion of this course, students will be:

CO1	Able to know the role of soil in geo-environmental applications and impact of ground contamination on geo-environment
CO2	Able to predict the suitability of clayey soil for various geoenvironmental problems
CO3	Able to understand the concept of soil water interaction, unsaturated soil and its importance in geo-environmental problems and factors effecting retention and transport of contaminants
CO4	Able to have an idea on role of soil in waste containment, different components of waste containment system and its stability and able to design waste containment facilities
CO5	Able to plan site remediation methods

Syllabus

Module 1

Fundamentals of Geo-environmental Engineering- Scope of geo-environmental engineering - multiphase behaviour of soil – role of soil in geo-environmental applications – importance of soil physics, soil chemistry, hydrogeology, biological process –sources and type of ground contamination– impact of ground contamination on geo-environment - case histories on geo-environmental problems.
8 lectures

Module 2

Clay mineralogy Types of bonds; Clay-Water system; Diffused Double Layer; Gouy-Chapman theory, Kaolinite, Illite, Montmorillonite, SEM and DTA
8 lectures

Module 3

Soil-Water-Contaminant Interaction- Concepts of unsaturated soil – importance of unsaturated soil in geo-environmental problems - measurement of soil suction -water retention curves - water flow in saturated and unsaturated zone. Soil-water-contaminant interactions and its implications – Factors effecting retention and transport of contaminants
8 lectures

Module 4

Waste Containment System-Evolution of waste containment facilities and disposal practices – Site selection based on environmental impact assessment –different role of soil in waste containment – different components of waste containment system and its stability issues – property evaluation for checking soil suitability for waste containment –design of waste containment facilities
8 lectures

Module 5

Contaminant Site Remediation -Site characterization – risk assessment of contaminated site – remediation methods for soil and groundwater – selection and planning of remediation methods – some examples of in-situ remediation
8 lectures

TEXT BOOKS

1. Geotechnical and Geo-environmental Engineering Handbook by Rowe R.K., Kluwer Academic Publications, London, 2000.
2. Geo-environmental Engineering, Principles and Applications" by L. N. Reddi and H. I. Inyang, by Marcel Dekker Inc. New York, 2000.
3. Geo-environmental Engineering, Contaminated Soils, Pollutant Fate, and Mitigation by R. N. Yong, CRC Press, New York, 2001.

4. Geo-environmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies by H.D. Sharma and K.R. Reddy, John Wiley & Sons, Inc., USA, 2004.
5. Soil Mechanics for Unsaturated Soils by D.G. Fredlund and H. Rahardjo, Wiley-Interscience, USA, 1993. 37
6. Fundamentals of Soil Behaviour by J. K Mitchell, Wiley, 2005.

REFERENCE BOOKS:

1. Introduction to Environmental Soil Physics by D Hillel, Academic Press, New York, 2003.
2. Environmental Soil Chemistry by D.L. Sparks, "Academic Press, New York, 2002.
3. Design of landfills and integrated solid waste management by A. Bagchi, John Wiley & Sons, Inc., USA, 2004.
4. Soil-Water-Solute Process Characterization: An Integrated Approach by J. Alvarez-Benedi and R. Munoz-Carpena, R., "CRC Press, New York, 2005.
5. Berkowitz, B. Dror, I. and Yaron, B., "Contaminant Geochemistry" Springer, Germany, 2008.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design POs met through

Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	✓	✓	✓		
End Sem Examination Marks	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1		2	1			3	3	3	2	2			3		2
2		2	1	3		2	2	2		2			3		
3	3	2	3			3	3	3	2	2			3		2
4	3	2	3			3	3	3	2	2			3		2
5	3	2	3			3	3	3	2	2			3		2

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2 and CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2 and CD8
CD3	Seminars	CO3	CD1, CD2 and CD8
CD4	Mini projects/Projects	CO4	CD1, CD2 and CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2 and CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE322

Course title: Rock Mechanics and Geology

Pre-requisite(s): Basics of Soil Mechanics

Co- requisite(s): Performance of laboratory experiments

Credits: L: T: P:

Class schedule per week:

Class: B.Tech.

Semester / Level:

Branch: Civil Engineering

Name of Teacher:

Course Objectives

This course enables the students:

1.	To understand the characteristics of rock
2.	To understand the method of rock exploration and rock testing
3.	To evaluate the engineering behaviour of rock
4.	To understand the process of rock forming and mineralogy
5.	To evaluate structural geology

Course Outcomes

After the completion of this course, students will be:

1	Capable to identify the rock fabrics, joints and faults
2	Able to perform rock exploration and rock testing
3	Able to analyse engineering behaviour of rock
4	Capable to identify minerals present in rocks
5	Able to identify contours; Classify folds, unconformities etc.

Syllabus

Module 1. Introduction and Basic Concepts

Rock as material-geological considerations; Rock forming minerals; Fabric of rocks; Mechanical nature of rock; Joints and Faults.

Module 2. Rock Exploration and Rock Testing

Objective; Methods of rock exploration; Direct penetration; Core boring; Core recovery; Rock Quality Designation; Laboratory testing of rock specimens: Uniaxial compression, Tri-axial shear tests at high confining pressures.

Module 3. Rock Engineering Behaviour

Mechanical behaviour: Strength of rocks; Influence of discontinuities upon engineering behaviour of rock masses; Rock quality indices; Joints; Folds and Faults; Methods of improving properties of rock masses: Pressure grouting; Consolidation grouting, Rock reinforcement.

Module 4. Mineralogy

Symmetry and forms in common crystal classes; Physical properties of minerals; Isomorphism and polymorphism, Structure of silicates; Mineralogy of common rock-forming minerals; Mode of occurrence of minerals in rocks. Transmitted polarised light microscopy and optical properties of uniaxial and biaxial minerals.

Module 5. Structural Geology

Concept of stratum; Contour; Outcrop patterns; Maps and cross sections; Dip and strike; Classification and origin of folds, unconformities, foliations and lineations; shear zones. Stereographic and equal area projections of planes and lines; computation of true thickness of beds from outcrops and bore-holes.

Text books:

1. Jaeger and Cook: Fundamental of Rock Mechanics.

Reference books:

1. Stagg K.G. and Zienkiewicz O.C: Rock Mechanics in Engineering Practice.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓			
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	2	1					1		3	2	1	
2	3	2	1	2	1					1		3	2	1	
3	3	2	1	2	1					1		3	2	1	
4	3	2	1	2	1					1		3	2	1	
5	3	2	1	2	1					1		3	2	1	

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD3, CD6, CD8, CD9
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD3, CD6, CD8, CD9
CD3	Seminars	CO3	CD1, CD2, CD3, CD6, CD8, CD9
CD4	Mini projects/Projects	CO4	CD1, CD2, CD3, CD5, CD6, CD8, CD9
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD3, CD6, CD8, CD9
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE323

Course title: GROUND ENGINEERING

Pre-requisite(s): CE303 Geotechnical Engineering

Co-requisite(s): None

Credits: L: 3 T: 0 P:0 C: 3

Class schedule per week: 3

Class: B. Tech

Semester / Level: 04

Branch: Civil (Department In depth Specialization in Geotechnical Engineering)

Name of Teacher:

Course Objectives

This course enables the students:

A.	To familiarize with commonly occurring clay minerals (K2, K3)
B.	To understand importance of drainage in construction scenario (K2, K3, K4)
C.	To estimate stress states in soil under different conditions (K2, K3, K4, K5)
D.	To get introduced to critical state soil mechanics (K2, K3, K4)
E.	To study the basics of bulkheads, cofferdams, shafts, tunnels & conduits (K2, K3, K4)

Course Outcomes

After the completion of this course, students will be:

CO1.	Interpret soil behavior based on clay mineralogy
CO2.	Suggest appropriate drainage methods for site specific construction works
CO3.	Develop stress paths in soils
CO4.	Comprehend the concept of critical state soil mechanics
CO5.	Analyze different civil engineering structures like bulkheads, cofferdams, shafts, tunnels & conduits

SYLLABUS

Module I : Clay Mineralogy

Clay minerals: structure of clay minerals, atomic & molecular bond, adsorbed and double layer water; Structure of soils in deposits: honey-combed, flocculated & dispersed structures

8 Lectures

Module II : Drainage & Dewatering

Ditches & sumps, Well point system, Shallow well system, Deep well drainage, Electro osmosis method, Protective filters

8 Lectures

Module III : Shear Strength

Use of stress path in triaxial test, Undrained & drained tests for N.C. & O.C. clay samples. Elastic & Plastic deformation, yielding, hardening and plastic flow, Elastic & Elasto-Plastic behaviour

8 Lectures

Module IV : Critical State Soil Mechanics

Introduction, Critical State line, Roscoe and Hvorslev surfaces, State boundary – Interpretation and significance

8 Lectures

Module V : Bulk head, Cofferdams Shaft, Tunnels & Conduits

Classification of bulkheads, cantilever sheet pile wall in soils (concept of ground improvement incorporating reinforced earth retaining wall & foundation in filled up soil), Anchored bulkhead concepts, coffer dams,

Stress distribution in the vicinity of shaft & around tunnels, arching in soils; Classes of underground conduits, loads on conduits

8 Lectures

Text books:

1. Leonards G. A. : Foundation Engineering, McGraw Hill
2. Scott R. F. : Soil Mechanics

Reference books:

1. Basic & Applied Soil Mechanics by G. Ranjan & A.S.R. Rao
2. Garg S.K. – Soil Mechanics & Foundation Engineering

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	√
Seminars/Assignments	√
Laboratory experiments/teaching aids	√
Industrial/guest lectures	√
Industrial visits/in-plant training	√
Self- learning such as use of NPTEL materials & internets	√
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	√	√	√		
End Sem Examination	√	√	√	√	√
Quiz 1	√	√	√		
Quiz 2			√	√	√
Assessment/Assignment by Teacher	√	√	√	√	√

Indirect Assessment –

Student feedback on course

Mapping between Course Outcomes & Program Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	2	2	3	1	3	3	2	3	3	3	3
CO2	3	3	3	2	2	2	3	1	3	3	2	3	3	3	3
CO3	3	3	3	2	2	2	3	1	3	3	2	3	3	3	3
CO4	3	3	3	2	2	2	3	1	3	3	2	3	3	3	3
CO5	3	3	3	2	2	2	3	1	3	3	2	3	3	3	3

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs & Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD2	Tutorials/Assignments	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8,
CD3	Seminars	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD6	Industrial/guest lectures	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD7	Industrial visits/in-plant training	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD8	Self- learning such as use of NPTEL materials & internets	CO1 to CO5	CD1,CD2,CD3,CD5,CD6,C D7,CD8
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE324

Course title: Geotechnics and Earthquakes

Pre-requisite(s): Basics of Soil Mechanics

Co-requisite(s): Performance of laboratory experiments

Credits: L: T: P:

Class schedule per week:

Class: B.Tech.

Semester / Level:

Branch: Civil Engineering

Name of Teacher:

Course Objectives

This course enables the students:

1.	To understand the characteristics of internal structure of earth and measurement of earthquake.
2.	To understand seismic hazard analyses.
3.	To evaluate the ground response analyses.
4.	To understand the process of liquefaction.
5.	To evaluate site conditions pertaining to earthquake.

Course Outcomes

After the completion of this course, students will be:

1	Capable to analyse seismic waves and plate tectonics, measure earthquakes.
2	Able to perform Deterministic seismic hazard analysis, Probabilistic seismic hazard analysis.
3	Able to perform analyses of ground response.
4	Capable to predict the liquefaction susceptibility of soils.
5	Able to perform time history analysis and site specific study.

Syllabus

Module 1. Seismology and earthquakes

Introduction, Internal structure of Earth, Seismic waves, Plate tectonics, Fault geometry, Fault movement, Elastic rebound theory. Size of earthquake – Earthquake intensity, Earthquake magnitude, Earthquake energy.

Module 2. Seismic hazard analysis

Identification and evaluation of earthquake sources – Geologic evidence, Tectonic evidence, Historic seismicity, Instrumental Seismicity. Deterministic seismic hazard analysis, Probabilistic seismic hazard analysis – Earthquake source characterization, Predictive relationships, Temporal uncertainty, Probability computations.

Module 3. Ground response analysis

One dimensional ground response analysis – Linear and Non-linear approaches, Two dimensional ground response analysis – Finite element approach, Equivalent linear approach, Non linear approach, Three dimensional ground response analysis – Equivalent linear finite element approach, Non linear finite element approach, Shear beam approach.

Module 4. Liquefaction

Flow liquefaction, Cyclic mobility, Liquefaction susceptibility – Historical/ Geologic/ Compositional/ State criteria., Influence of excess pore pressure, Development of sand boils, Settlement, Instability

Module 5. Local site effects and design ground motions

Effects of local site conditions on ground motion, Development of design parameters- Site specific development, Code based development, Development of ground motion time histories – Time domain generation, Frequency domain generation.

Text books:

2. Kramer, S.L. “Geotechnical Earthquake Engineering.” Pearson Education, New Delhi.
3. Saran, S. “Soil Dynamics & Machine Foundation.” Galgotia Pub. Pvt. Ltd. New Delhi.

Reference books:

2. Day Robert, W. “Geotechnical Earthquake Engineering Handbook.” McGraw-Hill, New York.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓			
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	2	1					1		3	2	1	
2	3	2	1	2	1					1		3	2	1	
3	3	2	1	2	1					1		3	2	1	
4	3	2	1	2	1					1		3	2	1	
5	3	2	1	2	1					1		3	2	1	

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD3, CD6, CD8, CD9
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD3, CD6, CD8, CD9
CD3	Seminars	CO3	CD1, CD2, CD3, CD6, CD8, CD9
CD4	Mini projects/Projects	CO4	CD1, CD2, CD3, CD5, CD6, CD8, CD9
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD3, CD6, CD8, CD9
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course Code: CE325

Course Title: Soil Engineering Software Laboratory

Pre-requisite(s): Nil

Co- requisite(s): Nil

Credits: L: 0 T: 0 P: 4

Class schedule per week: 4

Class: B. Tech.

Semester / Level: Sixth/Three

Branch: Civil Engineering (In depth Specialization in Geotechnical Engineering)

Name of Teacher:

Course Objectives

This course envisions to impart students to:

1.	To familiarize students with different Geotechnical Engineering Software
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Course Outcomes

After the completion of this course, students will be able to:

CO1	To be able to simulate, study, analyze, & solve Geotechnical Engineering problems using different Geotechnical Engineering software.
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SYLLABUS

- 1) Settlement of a circular footing on sand
- 2) Submerged construction of an excavation
- 3) Construction of a road embankment
- 4) Stability of dam under rapid drawdown
- 5) Flow through an embankment
- 6) Stability of dam subjected to seepage forces
- 7) Stability of slope by soil nailing
- 8) Simulation of pile driving
- 9) Flow around a sheet pile wall
- 10) Slope stability analysis of an embankment subjected to surcharge loading

Text Books/Reference Books:

Manuals of software

Online resources available in the internet

Gaps in the Syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Outcome (CO) Attainment Assessment Tools & Evaluation Procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Evaluation	40

Indirect Assessment

Students' Feedback on Course Outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CO1	3	3	3	3	3		3	3				3	3	3	3

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs and Course Delivery (CD) methods

CD Code	Course Delivery Methods	Course Outcome	Course Delivery Method Used
CD1	Lecture by use of Boards/LCD Projectors	CO1	CD1, CD2, CD3, CD5, CD8, CD9
CD2	Tutorials/Assignments	CO1	CD1, CD2, CD3, CD5, CD8, CD9
CD3	Seminars	CO1	CD1, CD2, CD3, CD5, CD8, CD9
CD4	Mini Projects/Projects	CO1	
CD5	Laboratory Experiments/Teaching Aids	CO1	CD1, CD2, CD3, CD5, CD8, CD9
CD6	Industrial/Guest Lectures	CO1	
CD7	Industrial Visits/In-plant Training	CO1	
CD8	Self- learning such as use of NPTEL Materials and Internets	CO1	CD1, CD2, CD3, CD5, CD8, CD9
CD9	Simulation	CO1	CD1, CD2, CD3, CD5, CD8, CD9

COURSE INFORMATION SHEET

Course code: CE419

Course title: ADVANCED GEOTECHNICAL ENGINEERING

Pre-requisite(s): CE303 Geotechnical Engineering

Co- requisite(s): None

Credits: L: 3 T: 0 P: 0 C: 3

Class schedule per week: 3 Class: B. Tech

Semester / Level: 04

Branch: Civil

Name of Teacher:

Course Objectives

This course enables the students:

1.	To familiarize with the procedures involved in a geotechnical site investigation.
2.	To estimate stress distribution & settlement in soil media.
3.	To understand the earth pressure theory.
4.	To study stability of slopes.
5.	To comprehend the basics of machine & well foundations.

Course Outcomes

After the completion of this course, students will be:

CO1.	Perform soil investigation for common civil engineering works.
CO2.	Determine stress distributions in soils & estimate different types of settlement.
CO3.	Calculate earth pressure for the design of earth retaining structures.
CO4.	Perform stability analysis of slopes.
CO5.	Analyze SDOF systems & understand the basic concept of machine & well foundations.

SYLLABUS

MODULE	(NO. OF LECTURE HOURS)
Module I	8
Site Investigation & subsoil exploration: Methods of soil exploration; Planning a subsoil exploration: Number of boreholes & depths of exploration for various types of works; Field Tests: Standard penetration test; Dynamic & Static cone penetration tests; Vane shear test; Geophysical Exploration; Soil samplers & collection of soil samples	
Module – II	12
Stress Distribution in Soil Media & Settlement: Stress Distribution: Boussinesq's & Westergaard's equations, Pressure distribution diagram, Newmark's influence chart; Contact pressure below foundations –Steinbrenner's coefficients; Settlement of foundations : Elastic, Consolidation & Creep settlements; Total & Differential settlements; Rate of settlement, I. S. Code limitations for different structures Settlement calculation from consolidation characteristics & using N-values	
Module – III	8
Earth Pressure Theory - Plastic equilibrium in soil – active & passive cases. Active earth pressure –Rankine's Theory; Active & passive earth pressure of cohesive & cohesion-less soil; Rankine's active thrust by trial wedge; Coulomb's wedge theory – Rebhann's construction & Culmann's construction	
Module IV	6
Stability of Slopes - Stability analysis of finite & infinite slopes; Types of slope failures; Methods of analysis for slope stability – method of slices; Bishop's simplified method; Friction circle method; Stability Number; Stability of slopes of Earth dams	
Module V	8
Introduction to Machine Foundations & Well Foundations Soil dynamics, Mass-spring system with & without damping; Machine Foundations: Types of Machines & Machine Foundations, Vibration isolation: Types & Methods of Isolation, Shapes & Types of wells or caissons, their advantages & disadvantages; components of a well foundation; Depth of well foundation & bearing capacity; Forces acting on a well foundation. Well sinking: operation & problems	

Text books:

1. Geotechnical Engineering by C. Venkatramiah
2. Soil Mechanics & Foundations by B.C. Punmia, A.K. Jain & A. K. Jain

Reference books:

1. Soil Mechanics & Foundation Engg. by S. K. Garg
2. Basic & Applied Soil Mechanics by G. Ranjan & A.S.R. Rao

Gaps in the syllabus (to meet Industry/Profession requirements)

Field exposure may not be possible for all components of the syllabus

POs met through Gaps in the Syllabus

PO6, PO11

Topics beyond syllabus/Advanced topics/Design

Critical state soil mechanics

POs met through Topics beyond syllabus/Advanced topics/Design

PO6, PO11

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	<input type="checkbox"/>
Seminars/Assignments	<input type="checkbox"/>
Laboratory experiments/teaching aids	<input type="checkbox"/>
Industrial/guest lectures	<input type="checkbox"/>
Industrial visits/in-plant training	<input type="checkbox"/>
Self- learning such as use of NPTEL materials & internets	<input type="checkbox"/>
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
End Sem Examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quiz 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Quiz 2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment/Assignment by Teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Indirect Assessment –

1. Student feedback on course

Mapping between Course Outcomes & Program Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3
CO2	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3
CO3	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3
CO4	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3
CO5	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs & Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1,CD2,CD3,CD5,CD6,CD7,CD8, CD9, CD4
CD2	Tutorials/Assignments	CO2	CD1,CD2,CD3,CD5,CD6,CD7,CD8, CD9, CD4
CD3	Seminars	CO3	CD1,CD2,CD3,CD5,CD6,CD7,CD8, CD4, CD9
CD4	Mini projects/Projects	CO4	CD1,CD2,CD3,,CD6,CD7,CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1,CD2,CD3,CD5,CD6,CD7,CD8, CD9
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials & internets		
CD9	Simulation		

Annexure - VI

In-depth Specialization in Structural Engineering

Students who have registered for B. Tech in Civil Engineering should complete 20 credits opting for courses listed below. The credits shall be over and above the minimum requirement for degree award. Courses shall be selected from a single specialization area only.

Semester/Session of study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery & Credits			Total Credits
					L	T	P	
Fifth (Monsoon)	Third	THEORY						
		DS	CE326	Advanced Mechanics of Solids	3	0	0	3
		DS	CE327	Matrix Analysis of Structures	3	0	0	3
TOTAL								6
Sixth (Spring)	Third	THEORY						
		DS	CE328	Finite Element Method in Civil Engineering	3	0	0	4
		DS	CE329	Concrete Technology & practices	3	0	0	3
		SESSIONAL						
DS	CE330	Technical Seminar	0	0	2	1		
TOTAL								8
Seventh (Monsoon)	Fourth	THEORY						
		DS	CE414	Prestressed Concrete	3	0	0	3
		DS	CE434	Fundamentals of Earthquake Engineering	3	0	0	3
TOTAL								6
GRAND TOTAL								20
<i>(Minimum requirement for in-depth specialization award)</i>								

COURSE INFORMATION SHEET

Course code: CE326

Course Title: Advanced Mechanics of Solids

Pre-requisite(s): CE201: Solid Mechanics

Corequisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 5th SEMESTER/ Level 3

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand different properties of materials under different type of loading conditions. (K1, K2, K3)
B.	To understand the stress patterns developed in deformable bodies to understand the application of stresses on an element. (K2, K3)
C.	To understand the stresses developed in pressure vessels. (K2, K3, K4)
D.	To analyse structural components with respect to their load deflection behaviour and capacity.(K1, K2, K3, K4)
E.	To analyse compression members subjected under loading and apply in design. (K2, K3, K4)

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand different types of load applications on structural components and the behaviour of structures with respect to the material properties. (K1, K2, K3)
2.	Understand the stresses and strains developed in different types of structural elements and apply the understanding in designing structural members.(K2, K3)
3.	Understand the stresses developed in thin walled sections and apply the understanding and knowledge in design of thin walled sections. (K2, K3, K4)
4.	Analyse structural components with respect to their load deflection characteristics. (K1, K2, K3, K4)
5.	Analyse compression members subjected to loading. (K2, K3, K4)

Syllabus

Module 1: Properties of Materials

Behaviour of Isotropic, Homogeneous, Anisotropic, Orthotropic materials, Failure mechanism of Ductile and Brittle materials. Resilience, Modulus of Resilience, Toughness, Modulus of Toughness, Hardness, Creep, Fatigue, Stress strain relationships of materials which carry Linear Elastic, Non- Linear, Elasto plastic, Perfectly plastic, Perfectly rigid, ideal fluid behaviour.

Module 2: Stresses and strains in element

Body force and Surface force. Stress and strain fields, Graphical Representation of stress and strain. Significance of elastic constants. Structural components in 3 dimensional plane. Support reactions (3 dimensional), Stress tensor and strain tensor for element in 2 dimensional plane, Stress tensor and strain tensor for element in 3 dimensional plane.

Module 3: Cylinders and Pressure vessels

Thick and Thin walled pressure vessels, Hoop's stress, Longitudinal stress, Radial stress, Shear stress distribution in thick and thin-walled cross-sections; shear center for thin-walled cross sections with at least one axis of symmetry, Thin cylinders with spherical ends.

Module 4: Load Deflection characteristics of structural components

Effect of Internal hinge, Internal joints and Internal reactions. Elongation of bar of unsymmetrical cross section in axial loading., Deflection of composite bars. Concept of equivalent bar. Bending of composite beams, Flitched beam. Conjugate Beam method, Unit load method, Method of superposition.

Module 5: Springs and Compression Members

Springs: Close coiled helical spring, open coiled helical spring, Laminated springs, Combination of springs, Rankine's theory of short column and long column. Difference between applications of Euler's theory and Rankine's theory for compression members. Columns under eccentric loading. Buckling of columns, Kern.

Text books:

1. Timoshenko S. P & Young D.H : Elements of Strength of Materials
2. Timoshenko S: Strength of Materials
3. Ramamrutham S & Narayan R: Strength of Materials
4. Subramanian R : Strength of Materials
5. Srinath L. S: Advanced Mechanics of Solids,
6. Timoshenko S. and Goodier J. N: Theory of Elasticity

Reference books:

1. Kazimi S. M. A : Solid Mechanics
2. Singh S: Theory of Elasticity
3. Ameen M: Computational Elasticity

Gaps in the syllabus (to meet Industry/Profession requirements)**POs met through Gaps in the Syllabus****Topics beyond syllabus/Advanced topics/Design****POs met through Topics beyond syllabus/Advanced topics/Design**

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	✓	✓	✓		
End Sem Examination Marks	✓	✓	✓	✓	✓
Quiz 1	✓	✓	✓		
Quiz 2			✓	✓	✓
Assignment	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	2	2	1				2	2	2	1	
2	3	3	2	1	1	1	1				1	1	1		
3	3	3	2	1	1	2	1					1	2	1	
4	3	3	2	2	1	2	1		1	1		2	2	1	1
5	3	3	2	3	2	2	1		1	1		2	2	1	1

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD8
CD3	Seminars	CO3	CD1, CD2, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE327

Course Title: MATRIX ANALYSIS OF STRUCTURES

Pre-requisite(s): CE202, CE207

Corequisite(s):

Credits: 3 L:4 T:0 P:0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 5TH SEMESTER / LEVEL 3

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Know and understand advanced analysis techniques for skeletal structures. (K1, K2)
B	Apply knowledge of stiffness matrix method in addressing large engineering problems. (K1, K2, K2, K4)

Course Outcomes

After the completion of this course, students will be to:

1.	Analyse plane trusses and frames of moderate size using stiffness matrix method. (K1, K2, K3, K4)
2.	Use computer for analysing bigger trusses and frames. (K3, K4)
3.	Apply the knowledge gained for creating better structures. (K3, K4)

K1- Remember; K2- Understand; K3- Apply; K4- Analyse; K5- Evaluate; K6- Create

Syllabus

Module -1:

Review of Structural Analysis:

Static Indeterminacy, Kinematic Indeterminacy and Stability of Structures, Force Methods, Displacement Methods.

(8L)

Module -2:

Matrix Method of Analysis:

Basic Matrix Operations, Solution of Linear Simultaneous Equations, Coordinate Systems; Displacement and Force Transformation Matrices, Stiffness Approach.

(8L)

Module -3:

Stiffness Matrix Method for Beams:

Conventional Beam Element Stiffness (Four DOF), Reduced Beam Element Stiffness (Two DOF), Generation of Stiffness Matrix for Continuous Beam; Dealing with Internal Hinges, Hinged and Fixed Supports, Solution Procedure.

(8L)

Module -4:

Stiffness Matrix Method for Plane Frames:

Conventional Element Stiffness (Six DOF), Reduced Element Stiffness (Three DOF), Generation of Structure Stiffness Matrix and Solution Procedure.

(8L)

Module -5:

Computer Implementation / Demonstration

Analysis of a moderately big truss or a frame using computer programs.

(8L)

Text books:

1. Devdas Menon, "Advanced Structural Analysis", Narosa Publishing House, 2009.
2. Asslam Kassimali, "Matrix Analysis of Structures", Brooks/Cole Publishing Co., USA, 1999.
3. Amin Ghali, Adam M Neville and Tom G Brown, "Structural Analysis: A Unified Classical and Matrix Approach", Sixth Edition, 2007, Chapman & Hall.

Reference books:

1. Matrix analysis of framed structures, Weaver and Gere.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3
Mid Sem Examination Marks	✓	✓	✓
End Sem Examination Marks	✓	✓	✓
Quiz 1	✓	✓	✓
Quiz 2	✓	✓	✓
Assignment		✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	1	2				1		3	2		
2	3	3	3	2	1	2				2		3	3		
3						3		3							3

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD4, CD8
CD3	Seminars	CO3	CD2, CD4, CD8

COURSE INFORMATION SHEET

Course code: CE328

Course Title: Finite Element Method in Civil Engineering

Pre-requisite(s): Advanced Structural Analysis, Solid Mechanics

Corequisite(s):

Credits: 4 L:4 T:0 P:0

Class schedule per week: 4

Class: B. Tech

Semester / Level: 6TH SEMESTER / LEVEL 3

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Know and understand Finite Element Method for solid mechanics. (K1, K2)
B	Apply knowledge of finite element method in analysing continuum problems. (K1, K2, K2, K4)

Course Outcomes

After the completion of this course, students will be to:

1.	Use Finite Element Method for structural analysis. (K1, K2, K3, K4)
2.	Use a Finite Element Program / Software for structural analysis (K3, K4)
3.	Solve continuum mechanics problems. (K3, K4)

K1- Remember; K2- Understand; K3- Apply; K4- Analyse; K5- Evaluate; K6- Create

Syllabus

Module 1

Introduction: History and Applications, Spring and Bar Elements: Minimum Potential Energy Principle, Truss Structures: Direct Stiffness Method, Nodal Equilibrium equations, Assembly of Global Stiffness Matrix, Element Strain and Stress.

(8L)

Module II

Beam Elements: Flexure Element, Element Stiffness Matrix, Element Load Vector. Method of Weighted Residuals: Galerkin Finite Element Method, Application to Structural Elements

(8L)

Module III

Interpolation Functions: Compatibility and Completeness Requirements, Polynomial Forms, Applications to Element Types: Triangular Elements, Rectangular Elements, Three- Dimensional Elements, Numerical Integration: Gaussian Quadrature.

(8L)

Module IV

Application to Solid Mechanics: Modeling Beams on Elastic Foundations, Plane Stress: CST Element, Plane Strain: Rectangular Element, Strain and Stress Computations.

(8L)

Module V

Computer Implementation / Demonstration of FEM procedures: Pre-Processing, Solution, Post-Processing, Use of Commercial FEA Software.

(8L)

Text books:

4. Fundamentals of Finite Element Analysis, Hutton David, Mc-Graw Hill, 2004.
5. Concepts and Applications of Finite Element Analysis, Cook R. D., Wiley J ., New York, 1995.
6. Finite Element Method, Zienkiewicz O.C. & Taylor R.L. Vol. I, II & III, Elsevier, 2000.

Reference books:

1. Finite Element Methods in Engineering, Belegundu A.D., Chandrupatla, T.R., Prentice Hall India, 1991.
2. Finite Element Analysis, Seshu P., Prentice-Hall of India, 2005.
3. Finite Element Analysis, Buchanan G.R., McGraw Hill Publications, New York, 1995.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3
Mid Sem Examination Marks	✓	✓	✓
End Sem Examination Marks	✓	✓	✓
Quiz 1	✓	✓	✓
Quiz 2	✓	✓	✓
Assignment		✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	1	2				1		3	2		
2	3	3	3	2	1	2				2		3	3		
3						3		3							3

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD4, CD8
CD3	Seminars	CO3	CD2, CD4, CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE329

Course Title: CONCRETE TECHNOLOGY & PRACTICES

Pre-requisite(s):

Corequisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 3

Class: B.Tech.

Semester / Level: 6th SEMESTER/ Level 3

Branch: Civil Engineering

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Understand and Apply different codes for mix design of Concrete (K2, K3)
B.	Understand and Analyse different types of Concrete (K2, K4)
C.	Create different types of Concrete (K6)
D.	Evaluate and analyse the NDT test on Concrete (K3, K5)

Course Outcomes

After the completion of this course, students will be able to:

CO1	Various types of Concrete.
CO2	Discuss concrete ingredients and influence on strength and durability properties.
CO3	Design the concrete mix using ACI and IS code methods and determine Nondestructive test.

Syllabus

Module I

Concrete mix design- Mix design for compressive strength by IS methods, British method, Mix design for flexural strength

(8L)

Module II

High performance concrete, Constituents of high-grade Concrete, various test and application of high performance concrete.

(8L)

Module III

Admixtures- plasticizers, retarders, accelerators, and other admixture, test on admixtures, chemistry and compatibility with Concrete.

(8L)

Module IV

Ready mix concrete, requirements of ready mix concrete, transit mixer details, Polymer modified cement Concrete, fibre reinforced Concrete, Concrete for repair and rehabilitation of structures, ferro cement, different test.

(8L)

Module V

Non-Destructive Testing of Concrete- hammer test, ultrasonic pulse velocity test, load test, carbonation test, corrosion of steel, core test and relevant IS code.

(8L)

Books recommended:

TEXT BOOKS:

1. Concrete Technology, A.R. Santhakumar,-Oxford University Press.
2. Concrete- P.K. Mehta, P J M Monteiro,- Prentice Hall, New Jersey
3. Concrete Technology Theory & Practice, M.S. Shetty, S.Chand and Co, 2004
4. IS 10262-2004, ACI Code for Mix Design

REFERENCE BOOKS:

1. Properties of Concrete- Neville, A.M., Longman Publishers, 2004.
2. Properties of Fresh Concrete, Power T.C.- E and FN, London

Gaps in the syllabus (to meet Industry/Profession requirements) :

POs met through Gaps in the Syllabus: **PO5 & PO6**

Topics beyond syllabus/Advanced topics/Design:

POs met through Topics beyond syllabus/Advanced topics/Design: **PO5 & PO6**

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS AND EVALUATION PROCEDURE

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50

Assessment Tool	% Contribution during CO Assessment
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3
Mid Sem Examination Marks	✓	✓	✓
End Sem Examination Marks	✓	✓	✓
Quiz 1	✓	✓	✓
Quiz 2	✓	✓	✓
Assignment		✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Course Outcome #	Program outcomes												Program specific outcomes			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	3	3	2	2	1	2				1		3	2			
2	3	3	3	2	1	2				2		3	3			
3						3		3								3

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD4, CD8
CD3	Seminars	CO3	CD2, CD4, CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE414

Course Title: PRE-STRESSED CONCRETE

Pre-requisite(s): CE 301

Corequisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Class: B.Tech.

Semester / Level: 7TH SEMESTER / LEVEL4

Branch: Civil Engineering

Name of Teacher:

Course Objectives:

This course enables the students to:

A.	Develop basic knowledge of prestressed concrete so that the students can solve real engineering problems. (K ₁ , K ₂)
B.	Understand behaviour of prestressed concrete structures subjected to simple and complex mechanical loadings. (K ₁ , K ₂)
C.	Analyse and design safe and sound prestressed concrete civil engineering structures. (K ₃ , K ₄)

Course Outcomes:

At the end of the course, a student should be able to:

1.	Evaluate the feasibility of using prestressed concrete for a given structure. (K ₁ , K ₂ , K ₃)
2.	Evaluate safety of a proposed prestressed concrete structure before construction and manufacturing. (K ₄)
3.	Evaluate the behaviour of prestressed concrete structures under the action of complex static loads keeping in mind the losses in prestress. (K ₁ , K ₂ , K ₃ , K ₄)
4.	Design or propose new prestressed concrete structures for solving real problems. (K ₁ , K ₂ , K ₃ , K ₄)
5.	Evaluate serviceability of a given prestressed concrete structure. (K ₃ , K ₄)

K1- Remember; K2- Understand; K3- Apply; K4- Analyse; K5- Evaluate; K6- Create

Module I: Introduction to Prestressed Concrete

Brief History, Advantages of Prestressing, Limitations of Prestressing, Types of Prestressing, Prestressing Systems and Devices, Properties of Hardened Concrete and Prestressing Steel.

Module II: Analysis of Members

Analysis of Members Under Axial Load, Analysis of Member Under Flexure, Cracking moment, Kern point, Pressure line, Analysis for Shear and Torsion.

Module III: Losses in Prestress

Elastic Shortening, Friction, Anchorage Slip, Creep of Concrete, Shrinkage of Concrete, Relaxation of Steel.

Module IV: Design of Members

Design for Axial Tension, Design for Flexure, Design for Shear and Torsion.

Module V: Calculations of Deflection and Crack Width

Deflection due to Gravity Loads and Prestressing Force, Limits of Deflection, Limits of crack width and its calculation.

Text books:

1. Prestressed Concrete, Krishnaraju N., Tata McGraw Hill, New Delhi, 1981.
2. Design of Prestressed Concrete Structures, Lin T.Y., Asia Publishing House, 1955.

Reference books:

1. Limited State Design of Prestressed Concrete, Guyan Y., Applied Science Publishers, 1972.
2. IS 1343- Code of Practice for Prestressed Concrete.

Gaps in the syllabus (to meet Industry/Profession requirements) :

Design of real-time industrial projects.

POs met through Gaps in the Syllabus:

Topics beyond syllabus/Advanced topics/Design:

POs met through Topics beyond syllabus/Advanced topics/Design:

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS AND EVALUATION PROCEDURE

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	✓	✓	✓		

Assessment Components	CO1	CO2	CO3	CO4	CO5
End Sem Examination Marks	✓	✓	✓	✓	✓
Quiz 1	✓	✓	✓		
Quiz 2			✓	✓	✓
Assignment	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	2	2								3	1	3
2	3	2	3	2	2								3	1	3
3	3	2	3	2	2								3	1	3
4	3	2	3	2	2								3	1	3
5	3	2	3	2	2								3	1	3

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2 and CD8
CD2	Tutorials/Assignments	CO2	CD1, CD4 and CD8
CD3	Seminars	CO3	CD1, CD2 and CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 434

Course Title: Fundamentals of Earthquake Engineering

Pre-requisite(s): CE201: Solid Mechanics

CE202: Structural Analysis I

CE207: Structural Analysis II

Corequisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 7th SEMESTER/ Level 4

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand the properties of seismic waves and the behavior of structures under ground motion. (K1, K2)
B.	To understand the dynamic loading and its impact on different types of structures and apply numerical methods for analysis. (K2, K3, K4)
C.	To apply standard criteria for Earthquake Resistant Design as per the standard codes. (K1, K2, K3, K4)
D.	To understand the seismic soil structure interaction and its effect on structures (K1, K2)
E.	To evaluate structures by performing seismic evaluation and to apply seismic retrofitting strategies. (K1, K2, K3, K4)

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the effect of ground motion in structures and structural components.(K1, K2)
2.	Apply numerical methods and algorithms for performing the dynamic analysis of structures and structural components. (K2, K3, K4)
3.	Apply standard criteria for Earthquake Resistant Design for Design and Construction of real life Structures. (K1, K2, K3, K4)
4.	Understand the dynamic soil structure interaction and its considerations. (K1, K2)
5.	Apply local and global retrofitting strategies for different structures after performing seismic evaluation. (K1, K2, K3, K4)

Syllabus

Module 1: Ground motion and its effects on structures

Introduction of Earthquake Engineering; Importance and necessity of Earthquake Resistant Design. Plate boundaries and Faults, Seismic waves and their impacts on structures; Recording devices; Earthquake data, Earthquake Magnitude, Earthquake Intensity, Isoseismal maps; Seismic zoning map.

Module 2: Dynamics of structures

Behaviour of structures under Dynamic loading. Effect of damping, Damping ratio, Behaviour of structures in harmonic loading, Mode shapes, Modal participation factor, Modal superposition, Response spectrum; Time domain solution of dynamic equation of motion, Newmark's average acceleration method, Newmark's linear acceleration method, Central Difference Method.

Module 3: Standard considerations for Earthquake Resistant Design of structures

Earthquake Resistant Design Criteria: Criteria for Earthquake Resistant Design as per IS 1893 (Part 1): 2016. Concept of Equivalent Static Method, BIS provisions for earthquake resistant design; Estimation of Base shear, Design lateral loads, Effect of Infill walls, Effect of structural walls in, Importance factor, Response reduction factor, Irregularities, Concept of Time history analysis.

Module 4: Dynamic Behaviour of soil & Seismic Soil structure Interaction

Seismic wave propagation through different mediums; Practical significance of Soil structure interaction, Fixed base structures, Structures on soft soil, Kinematic interaction, Inertial interaction; Concept of Seismic microzonation, Soil liquefaction.

Module 5: Seismic Evaluation and Retrofitting Strategies

Seismic Evaluation of structures; Seismic Retrofitting strategies: Global Retrofitting strategies, Local Retrofitting strategies, Retrofitting strategies for RC structures, Retrofitting strategies for Masonry structures, Non engineered masonry structures; Energy dissipation devices: Dampers; Base isolation techniques.

Text books:

1. AGARWAL PANKAJ and SHRIKHANDE MANISH : Earthquake Resistant Design of Structures, Prentice-Hall
2. CHOPRA A. K. : Dynamics of Structures – Theory and Applications to Earthquake Engineering, Prentice Hall
3. IS: 1893 - 2016, Criteria for Earthquake Resistant Design of Structures - Part 1 : General Provisions and Buildings [Indian Standard Code, BIS]
4. IS: 13920 - 2016, Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces - Code of Practice [Indian Standard Code, BIS]

Reference books:

1. M. J. N. Priestley and Thomas Paulay: Seismic Design of Reinforced Concrete and Masonry Buildings

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	✓	✓	✓		
End Sem Examination Marks	✓	✓	✓	✓	✓
Quiz 1	✓	✓	✓		
Quiz 2			✓	✓	✓
Assignment	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	1	1	1				1	1	1		
2	3	3	3	3	3	2	1			2	2	2	3	1	
3	3	3	3	2	2	3	1		1	2	1	3	3	2	3
4	3	2	2	2	2	2	1			1		2	1		
5	3	2	3	2	2	3	1		1	3	2	3	3	2	1

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD8
CD3	Seminars	CO3	CD1, CD2, CD4, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

Annexure - VII

Minor Specialization in Environmental Science and Engineering

Students who have registered for **B. Tech in Civil Engineering** should complete 20 credits, opting courses listed below. The credits shall be over and above the minimum requirement for degree award. Courses shall be selected from single specialization area only.

Semester/Session of study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery & Credits			Total Credits C – Credits
					L	T	P	
Fifth (Monsoon)	Third	Theory						
		PC	CE316	Environmental Pollution I	3	0	0	3
		PC	CE317	Environmental Impact Assessment and Regulations	3	0	0	3
		Sessional						
		PC	CE318	Environmental Science Engineering Lab.	0	0	4	2
Total							8	
Sixth (Spring)	Third	Theory						
		PC	CE319	Environmental Pollution II	3	0	0	3
		PC	CE320	Industrial Safety and Management	3	0	0	3
Total							6	
Seventh (Monsoon)	Fourth	Theory						
		PC	CE431	Environmental Management System and ISO Standards	3	0	0	3
		PC	CE432	Remote Sensing in Environmental Management	3	0	0	3
Total							6	
Grand Total							20	
(Minimum requirement for Minor specialization award)								

COURSE INFORMATION SHEET

Course code: CE316

Course title: Environmental Pollution I

Pre-requisite(s): NA

Co- requisite(s): NA

Credits: L:3 T:0 P:0

Class schedule per week: 03

Class: B.Tech

Semester / Level: 5th / 3rd

Branch:

Name of Teacher:

Course Objectives

This course enables the students:

1.	To understand the sources and the effects of air pollution. (K2)
2.	To identify suitable control equipment to combat particulate and gaseous pollutants. (K3)
3.	To interpret the emission due to vehicular pollution and suggest control methods. (K4)
4.	To understand the components of solid wastes and their collection, separation, and transfer facilities. (K2)
5.	To study the treatment of solid waste. (K3)

Course Outcomes

After the completion of this course, students will be:

CO1	Able to design air pollution sampling and monitoring plan in industry and in cities. (K3)
CO2	Able to suggest suitable air pollution control measures. (K5)
CO3	Able to interpret and identify the causes of vehicular emission and technological advancement for control. (K4)
CO4	Able to identify the need for solid waste management and plan effective solid waste collection and transfer options. (K4)
CO5	Able to design a solid waste treatment facility. (K3)

SYLLABUS

Module 1

[8]

Introduction: Sources and effects of air pollution

Classification and properties of gaseous and particulate pollutants, effects of air pollution on human health, properties, plants and ecosystems, scales of concentrations, case studies of air pollution episodes.

Module 2

[8]

Air Pollution dispersion and monitoring

Air sampling methods and devices, collection of gaseous and particulate pollutants, stack sampling, air pollution standards, fate of air pollutants and the effect of meteorological parameters on dispersion.

Module 3

[8]

Control technologies

Control methods and equipment for air pollution, legislations, policies and guidelines for air pollution control.

Module 4

[8]

Introduction to Solid Waste Management system

Sources and types of Solid Waste, functional elements of solid waste management, Methods of collection and transfer of solid wastes, Introduction to Hazardous and Biomedical Waste management

Module 5

[8]

Treatment of solid wastes

Separation, treatment and disposal, recycling and recovery of wastes, waste to energy transfer.

Text Books:

1. Environmental Engineering- Peavy & Rowe. Prentice Hall Pub.
2. Air Pollution Control – Rao and Rao
3. Environmental Pollution and Control – C.S. Rao
4. Tchobanoglous G., Theisen H., Vigil S.: Integrated Solid Waste Management Engineering Principles and Management Issues (McGraw Hill Education)

Reference Books:

- i. Noel de Nevers, Air Pollution Control Engineering, Mc Graw Hill, New York.
- ii. Arthur C. Stern, Air Pollution (Vol. I – Vol. VIII), Academic Press
- iii. Introduction to Environmental Engineering and Science, Gilbert M Masters
- iv. I. H. Khan, J Ahsan. Textbook on Solid Waste Management. CBS Publishers and Distributors Pvt Ltd.

Gaps in the Syllabus (to meet Industry/Profession requirements)

1. Field exposure.
2. On hand experiments.

POs met through Gaps in the Syllabus

PO7

Topics beyond syllabus/Advanced topics/Design

Advance monitoring of air pollution and air pollution modelling

POs met through Topics beyond syllabus/Advanced topics/Design

PO4, PO5, PO6, PO7

Course Outcome (CO) Attainment Assessment Tools & Evaluation Procedure

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4
Mid Sem Examination	✓	✓		
End Sem Examination	✓	✓	✓	✓
Quiz 1	✓	✓		
Quiz 2			✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CO1		1	2	2		3	3		1			1	2		
CO2		2	3	2		2	3					1	1		
CO3	2	2	3	2	2	3	3	2	1		1	1	3		1
CO4	2	2	3	3	2	3	3	1	2		2	2	3		1
CO5	1	2	3	2	3	2	3	1				1	2		3

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs and Course Delivery (CD) methods

CD Code	Course Delivery Methods	Course Outcome	Course Delivery Method Used
CD1	Lecture by use of Boards/LCD Projectors	CO1	CD1, CD7, CD 8
CD2	Tutorials/Assignments	CO2	CD1 and CD9
CD3	Seminars	CO3	CD1, CD2 and CD3
CD4	Mini Projects/Projects	CO4	CD1 and CD2
CD5	Laboratory Experiments/Teaching Aids	CO5	CD1 and CD2
CD6	Industrial/Guest Lectures		
CD7	Industrial Visits/In-plant Training		
CD8	Self- learning such as use of NPTEL Materials and Internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course Code: CE317

Course title: Environmental Impact Assessment and Regulations

Pre-requisites: Basic Science

Co- requisites: Environmental knowledge

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 3

Class: M. Tech

Semester / Level: 5th/3rd

Branch:

Name of Teacher:

Course Objectives

This course enables the students:

1.	To provide an overview on international conventions for sustainable environment (K2)
2.	To develop a basic understanding on the process of environmental impact assessment (K2)
3.	To understand the components of environmental reports and management plans (K3)

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify the international sustainable development initiatives (K2)
CO2	Understand the status of global environment (K3)
CO3	Understand the process of Environmental Impact Assessment (K3)
CO4	Analyse and document environmental project reports (K4)
CO5	Identify and mitigate impacts and prepare management plans (K5)

Syllabus

Module 1: International Conventions

[8]

Rio Declaration and its principles, COP 21, sustainable development initiatives, Basel Convention, Montreal Protocol

Module 2: Goals and Reportings

[8]

Millennium Development goals, IPCC reports, State of Environment: India, Environmental Reports and case studies.

Module 3: Concepts of EIA

[8]

Framework for environmental impact assessment. Environmental clearance, EIA process: Screening, Scoping and baseline studies, Public hearing, Mitigation. EIA notification.

Module 4: Environmental Aspects

[8]

Review of DPRs and Industrial Case studies, Term of References

Module 5: Impact Assessment and Management Plan

[8]

Impact assessment methodologies, Uncertainty in EIA, Risk Analysis, EMP preparation

TEXT BOOKS:

1. Environmental Impact Assessment by Larry Canter. McGraw Hill Publication.
2. Disaster Management- Edited by R. B. Singh. Rawat Publications. India.
3. Environmental Impact Assessment by A. K. Shrivastava. APH Pub. India.
4. Environmental Impact Assessment by Theory and Practice. Anji Reddy Mareddy, 1st Edition, eBook ISBN: 9780128112380, Paperback ISBN: 9780128111390, Butterworth-Heinemann.

REFERENCE BOOKS:

1. Methods of Environmental Impact Assessment by Graham Wood, Riki Therivel. ISBN-13: 978- 1138647671. Routledge; 4 edition.
2. Climate Change 2014 – Impacts, Adaptation and Vulnerability: Part A: Global and Sectoral Aspects. Working Group II Contribution to the IPCC Fifth Assessment Report. Volume 1. Global and Sectoral Aspects. Intergovernmental Panel on Climate Change. December 2014, ISBN: 9781107641655
3. Climate Change 2014 – Impacts, Adaptation and Vulnerability: Part B: Regional Aspects Working Group II Contribution to the IPCC Fifth Assessment Report. Volume 2. Intergovernmental Panel on Climate Change, December 2014, ISBN: 9781107683860.

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION PROCEDURE**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
First Quiz	10
Mid Semester Examination	25
Second Quiz	10
Teacher's Assessment	5
End Semester Examination	50

Indirect Assessment

1. Students' Feedback on Course Outcome.

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√			
End Sem Examination Marks	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

MAPPING OF COURSE OUTCOMES ONTO PROGRAM OUTCOMES

Course Outcome #	Program Outcomes												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1		1	2	2	1	1	1	2	1	1	1
2	3	2	1	1	1	2	3	2	2	2	1	2	1	3	3
3	3	3	2	2	2	3	4	3	3	2	2	2	3	2	3
4	2	1	1	1	1	2	2	3	2	3	1	2	1	1	1
5	2	3	1	2	2	3	3	3		1	1	2	2	2	1

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Gaps in the syllabus (to meet Industry/Profession requirements):

Syllabus is framed according to industrial and professional requirement.

POs met through Gaps in the Syllabus:

N.A

Topics beyond syllabus/Advanced topics/Design:

Module 4 will include preparation of draft reports.

POs met through Topics beyond syllabus/Advanced topics/Design:

2, 4

Course Delivery Methods

CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Assignments/Seminars
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures
CD5	Industrial visits/in-plant training
CD6	Self- learning such as use of NPTEL materials and internets
CD7	Simulation

MAPPING BETWEEN COURSE OUTCOMES AND COURSE DELIVERY METHOD

Course Outcome	Course Delivery Method
CO1	CD1, CD2
CO2	CD1,CD2
CO3	CD1,CD2,CD8
CO4	CD1,CD2, CD6,
CO5	CD1,CD2,CD8,

COURSE INFORMATION SHEET

Course code: CE318

Course title: Environmental Science and Engineering Laboratory

Credits: L: T: P:
 0 0 2

Class schedule per week:2

Class: B.Tech.

Semester / Level: 5th Semester Level 3

Course Objectives

This course enables the students:

A	To understand the methods to analyze environmental quality (K1, K2)
B	To be aware about the procedure for the analysis of various water quality parameters (K2)
C	To get to know the basic techniques of soil quality assessment from environmental point of view (K1, K2)
D	To get to know the fundamental experiments required to assess air quality (K1, K2)
E	To be aware of the permissible limits of environmental parameters and compare the various environmental quality parameters with them for meeting compliance. (K2, K3)

Course Outcomes

After the completion of this course, students will be able to:

1	Understand the basic methods to analyze water quality for a given purpose (K2, K3)
2	Understand the basic methods to analyze soil quality in different land use and Land cover areas (K2, K3)
3	Understand the basic methods to analyze ambient air quality (K2, K3)
4	Understand the importance of the standards according to permissible limits (K2, K3)
5	Understand the basic purpose of environmental quality monitoring and look for treatment solutions if required to meet compliance (K2, K3)

Syllabus

1. Community structure study of vegetation plot
2. Analysis of Acidity and Alkalinity of water sample
3. Analysis of pH, EC and turbidity of water samples
4. Analysis of Total Solids, Suspended Solids and Dissolved solids of water samples
5. Analysis of Total hardness of water samples
6. Analysis of Moisture content and Bulk density of Soil
7. Analysis of organic carbon of soil samples
8. Analysis of particulate matter of air

Text Books:

- Standard methods for the examination of water and wastewater published by APHA

- Handbook of Methods in Environmental Studies, S.K. Maity, ABD Publishers
- Handbook of Methods in Environmental Studies, 1: Water and Wastewater analysis, , S.K. Maity, ABD Publishers

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes						Program Specific Outcome		

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD5
CD2	Tutorials/Assignments	CO2	CD1, CD5
CD3	Seminars	CO3	CD1, CD5
CD4	Mini projects/Projects	CO4	CD1, CD2, CD5, CD6, CD7
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD5, CD6, CD7
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE319

Course title: ENVIRONMENTAL POLLUTION II

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Class: B.Tech.

Semester / Level: 6th SEMESTER/LEVEL 3

Branch:

Name of Teacher:

Course Objectives

This course enables the students to:

A.	assess the importance of water quality and quantity and interpret various water supply systems (K1, K2)
B.	apply the appropriate technologies for water treatment and water distribution systems (K3)
C.	explain the fundamentals of sewage treatment and management (K2)
D.	explain various types of conveyance systems for sewage (K2)
E.	identify and apply appropriate methods for sewage treatment and sludge management (K2, K3)

Course Outcomes

After the completion of this course, students will be able to:

1.	examine and explain different sources of water, water quality assessment and water demand estimation (K1, K2)
2.	analyze appropriate water treatment and water distribution methods (K3)
3.	interpret the concepts of sewage treatment and management (K2)
4.	interpret the requirement of sewage conveyance system (K2)
5.	explain and illustrate various techniques for sewage treatment and sludge disposal methods (K2, K3)

Syllabus

Module I: Water

[8]

Sources of water, water quality requirement for different applications, water quality, water borne diseases, water demand, population forecasting methods.

Module II: Water Treatment

[8]

Basics of water treatment, groundwater treatment, surface water treatment, disinfection methods, membrane filtration; water distribution systems – storage, conveyance & distribution

Module III: Sewage and its conveyance

[8]

Sewage characteristics, importance of sewage treatment, fundamentals of sewage treatment, sewage treatment – centralized and decentralized systems. Sewage conveyance - need for conveyance of sewage, domestic wastewater and storm water estimation, conveyance of sewage – sewer types, operation and maintenance of sewers, sewage pumping, sewer appurtenances, sewerage systems.

Module IV: Sewage treatment

[8]

Physico-chemical and biological treatment, aerobic and anaerobic treatment, suspended and attached growth systems, membrane processes, biological nutrient removal

Module V: Solids management (water and wastewater treatment plant)

[8]

Residuals management in water treatment plant; sludge management in wastewater treatment - thickening, stabilization, conditioning, dewatering; thermal and biochemical conversion processes

Text books:

1. Water Supply Engineering: Environmental Engineering - Vol. I, S.K. Garg, Khanna Publishers, New Delhi
2. Sewage Disposal and Air Pollution Engineering: Environmental Engineering - Vol. II, S.K. Garg, Khanna Publishers, New Delhi
3. Introduction to Environmental Engineering and Science, G.M. Masters & Wendell Ela, PHI Publishers
4. Environmental Engineering, Peavy, H., Rowe, D.R, Tchobanoglous, G. Mc-Graw - Hill International

Reference books:

1. Manual on Water Supply and Treatment. Ministry of Urban Development, New Delhi.
2. Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health and Environmental Engineering Organization, Ministry of Urban Development.
3. Metcalfe and Eddy. Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw-Hill, New Delhi.
4. Water and Wastewater Engineering – designs, principle and practice, Mackenzie L. Davis. McGraw-Hill Education

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓

Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓			
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1		1	1	2			3							
2		1	3	2			3							
3	1	1	3	2			3							
4	1	1	3	2			3							
5	1	1	3	2			3							

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD3
CD3	Seminars	CO3	CD1
CD4	Mini projects/Projects	CO4	CD1
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD3
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE320

Course title: Industrial Safety and Management

Pre-requisite(s):

Credits: L: T: P:
3 0 0

Class schedule per week: 3**Class: B.Tech.****Semester / Level: 6th Semester Level 3****Branch:****Name of Teacher:****Course Objectives:** This course enables the students to:

A	develop a basic understanding of hazards and safety measures prevailing in industries (K1, K2),
B	Know, the common accidents occurring in industries (K2)
C	Learn about various precautionary measures adopted in industries to avoid accidents through trainings (K2)
D	To be aware of the laws applicable for industrial safety (K3)
E	To develop awareness and sensitivity to Health and Safety practice in industry (K2, K3)

Course Outcomes:

After the completion of this course, students will be able to:

1	understand the common workplace hazards in industries (K1, K2)
2	Identify the specific hazards of specific industries (K1, K2)
3	Know about the different methods of hazard control through engineering control, administrative initiatives and protective equipment (K2)
4	Learn about the legal implications of industrial safety (K3)
5	Develop sensitivity towards industrial safety and occupational hazards related to industries (K2)

Syllabus**Module 1 : Industrial Hazards**

Different types of Hazards in industries (Mechanical, Chemical, Radiation, Fire, Electrical, and Biological), Hazard identification and Hazard analysis. Fault tree analysis, event tree analysis, Risk assessment records [8]

Module 2: Health and Safety Management system

OHSAS 18001, Safety standards and codes, Safety organization in loss prevention, safety education and training, Occupational health objectives and goals, occupational diseases [8]

Module 3: Accidents

Common causes of accidents, Investigation of Accidents, Social and Financial liabilities associated to accidents. [8]

Module 4: Hazard control and Emergency planning

Hierarchy of control – Machine guarding and PPE (need, selection, applicable standards, supply, use, care and maintenance. Respiratory PPE and Non- respiratory PPE), Emergency planning in industry [8]

Module 5: Legislation related to Industrial safety:

The Factories Act, 1948, Contract Labour (Abolition and Regulation) Act, Public Liability Insurance Act, Hazardous Material Transportation Rules. Rules and Regulations the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. [8]

TEXT BOOKS:

1. R.K.Jain and Sunil S.Rao , Industrial Safety, Health and Environment Management Systems, Khanna publishers , New Delhi (2006)
2. Herman Koren and Michel Bisesi, Handbook of Environmental Health and Safety: Jaico Publishing House, Delhi (1999).
3. Rao.S /Saluja H.L., Electrical Safety, Fire Safety Engineering and Safety Management, Publishers: Khanna Publishers, 1998
4. L.M. Deshmukh, Industrial safety management, Tata Mcgraw Hill, New Delhi, 2006.

REFERENCE BOOKS:

1. Industrial Safety -National Safety Council of India.
2. The Factories Act with amendments 1987, Govt. of India Publications DGFASLI, Mumbai.
3. Grimaldi and Simonds, Safety Management, AITBS Publishers, New Delhi (2001).
4. Industrial Safety and pollution control handbook: National Safety Council and Associate publishers Pvt. Ltd, Hyderabad (1993).
5. Encyclopedia of occupational health and safety, Inter National Labor Office.

Gaps in the syllabus (to meet Industry/Profession requirements):

POs met through Gaps in the Syllabus:

Topics beyond syllabus/Advanced topics/Design:

POs met through Topics beyond syllabus/Advanced topics/Design:

Course Delivery Methods

Course Delivery Methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Assignments/Seminars	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION PROCEDURE

DIRECT ASSESSMENT

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓	✓		
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓	✓		
Quiz 2				✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

INDIRECT ASSESSMENT –

1. Students' Feedback on Course Outcome

MAPPING BETWEEN COURSE OUTCOMES AND PROGRAM OUTCOMES

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	1	2	2	3
CO2	3	3	2	2	3	3
CO3	3	2	3	3	3	3
CO4	3	3	3	2	3	3
CO5	3	2	2	2	3	3

Correlation Levels 1, 2 or 3 as defined below:

- 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

COURSE INFORMATION SHEET

Course Code: CE431

Course title: Environmental Management System and ISO Standards

Pre-requisite(s):

Co-requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3 Class: B. Tech

Semester / Level: 7th/4th

Branch:

Name of Teacher:

Course Objectives

This course enables the students:

1.	To develop an understanding of international environmental standards (K3)
2.	To develop basic knowledge on components of ISO 14000 (k2)
3.	To develop and apply ISO 14000 for Environmental Management. (k4)

Course Outcomes

On completion of this course, students should be able to:

CO 1	Understand the need and origin of Environmental Management Standards (K2)
CO 2	Identify environmental aspects and impacts (K3)
CO 3	Prepare audit checklist and conduct mock auditing (K4)
CO 4	Identify global and national eco labels (K2)
CO 5	Assess and understand product life cycle and their environmental management (K5)

Syllabus

Module – I

[6]

History and Origin: Industrial Pollution and need for pollution management, The evolution of environmental management standard, Technical Committee 207, ISO 14000 series, applicability of ISO 14000, legal considerations and requirements of ISO 14000.

Module – II

[8]

Basic Concept: ISO 14000 based Environmental Management System: definition, principle, structure and benefits of Environmental Management System, Aspects and impacts, Preparation of documents for ISO 14000, ISO 14000 compliance.

Module – III

[8]

Environmental Auditing

ISO 14010: EMS Audit-definition, objective, general principles, scope, types and guidelines of environmental auditing process. Registration process for implementing ISO 14000, registration problems.

Module – IV

[8]

Eco Labels:ISO 14024: Eco-labelling communication to the public. Types of ecolabels, benefits of ecolabelling. Global and Indian ecolabels. Case study.

Module – V

[10]

LCA and Performance Evaluation: ISO 14031: Evaluating the organization environmental performance. ISO 14020: Guidelines & standards on environmental claims & declarations. Case study. ISO 14040: Guidelines, general principle of conducting life cycle assessment (LCA), definition, stages and scope of LCA, Case Study.

Text Books:

- 1.Environmental Audit: A.K. Shrivastava. APH Pub Corp. New Delhi.
- 2.ISO 14000: Environmental Management 1st Edition, David L. Goetsch , Stanley Davis. ISBN- 13: 978-0130812360. Jenson Books Inc.
- 3.ISO 14000 Environmental Management Standards: Engineering and Financial Aspects. Alan S. Morris. ISBN: 9780470851289 |Online ISBN:9780470090787 . John Wiley & Sons, Ltd

Reference Books:

1. Global Green standards: ISO 14000 and Sustainable Development. IISD pub. Minitoba.
2. ISO 14000 Answer Book: Environmental Management for the World Market (Wiley Quality Management) 1st Edition. by Dennis R. Sasseville W. Gary Wilson, Robert W. Lawson . ISBN-13: 978-0471179337. John Wiley and sons. Canada.

Gaps in the Syllabus (to meet Industry/Profession requirements)

1. Carbon emission and Green Reporting.
2. Personal and Professional Ethics.

POs met through Gaps in the Syllabus

7,8,9

Topics beyond syllabus/Advanced topics/Design

1. Quantification and Reporting of Green house gases -ISO 14064.
2. Introduction to OHSAS

POs met through Topics beyond syllabus/Advanced topics/Design

5,6,7

Course Outcome (CO) Attainment Assessment Tools & Evaluation Procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
First Quiz	10
Mid Semester Examination	25
Second Quiz	10
Teacher's Assessment	5
End Semester Examination	50

Indirect Assessment

1. Students' Feedback on Course Outcome.

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√			
End Sem Examination Marks	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
- 2 Student Feedback on Course Outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1		1	2	2	1	1	1	2	1	1	1
2	3	2	1	1	1	2	3	2	2	2	1	2	1	3	3
3	3	3	2	2	2	3	4	3	3	2	2	2	3	2	3
4	2	1	1	1	1	2	2	3	2	3	1	2	1	1	1
5	2	3	1	2	2	3	3	3		1	1	2	2	2	1

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD8, CD6
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD8
CD3	Seminars	CO3	CD1, CD2, CD6,
CD4	Mini projects/Projects	CO4	CD1, CD2, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE432

Course title: Remote Sensing in Environmental Management

Pre-requisites: Basic Science knowledge

Co- requisites:

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 7th/ 4th

Branch:

Name of Teacher:

Course Objectives

This course enables the students:

1.	To develop basic understanding of remote sensing
2.	To interpret and develop understandings on satellite image interpretation
3.	To assess the application of RS technologies in environmental engineering

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand working principles of remote sensing, history of satellite development Procurement of India and global satellite data
CO2	Interpret satellite images, verify and derive conclusions
CO3	Apply processing tools to classify land use and land cover using softwares
CO4	Apply GIS knowledge in solving real time problems.
CO5	Understand the extent and applications of remote sensing techniques

Syllabus

Module 1: Principles of Remote Sensing

[8]

Definition and Historical overview, Image Procurement, Electromagnetic spectrum, Atmospheric Windows, Physics of Remote Sensing, Spectral Signatures, Spectral Response pattern of soil, Vegetation & water. Ground verification.

Module 2: Satellite, Sensors and Image Interpretation

[8]

Imaging & non-imaging sensors, Active & passive sensors, High and Low resolution sensors, Sensor Resolutions, Indian and Global Satellites, Fundamentals of Image Interpretation Techniques. Applications of different sensors. Platforms and UAVs.

Module 3: Image Processing

[8]

Enhancement, Filtering, Indices, Supervised Classification and Unsupervised Clustering. Applications of processing tools. Softwares

Module 4: GIS & GPS

[8]

Definition, Data Types, Raster and Vector data, GIS softwares, Buffering, Overlay operations, Concepts and segments of GPS

Module 5: Applications

[8]

Applications of Remote Sensing, GIS & GPS in Environmental Management: Vegetation, Land, Disasters, Water resources.

TEXT BOOKS

1. Remote Sensing of the Environment – An Earth Resources Perspective by J.R. Jensen, 2006 Pearson Education, Inc. Singapore Pvt. Ltd., Indian edition, Delhi.
2. Introductory Digital Image Processing A remote sensing perspective , J.R. by Jensen 1996 Prentice Hall Series in GIS, USA
3. Remote Sensing and Image Interpretation by Lillesand, M. Thomas and Kiefer, W. Ralph, 2007 4th Edition, John Wiley and Sons, New York.
4. Global Positioning System: Signals, Measurements, and Performance Revised Second Edition Revised Second Edition ISBN-13: 978-0970954428. Pratap Misra, P Enge.
5. Introduction to Geographic Information Systems. Kang-Tsung Chang. McGraw Hill Education; 4 edition 1 July 2017. ISBN-10: 0070658986

REFERENCE BOOKS

1. Remote Sensing – Principles and Interpretation by F.F. Jr., Sabins, 2007. W.H. Freeman & Co.
2. Manual of Remote Sensing Robert G. by Reeves, 1991, Vol. I, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia, USA.

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION PROCEDURE**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
First Quiz	10
Mid Semester Examination	25
Second Quiz	10
Teacher's Assessment	5
End Semester Examination	50

Indirect Assessment

1. Students' Feedback on Course Outcome.

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination Marks	√	√			
End Sem Examination Marks	√	√	√	√	√
Assignment	√	√	√	√	√

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

MAPPING OF COURSE OUTCOMES ONTO PROGRAM OUTCOMES

Course Outcome #	Program Outcomes												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1		1	2	2	1	1	1	2	1	1	1
2	3	2	1	1	1	2	3	2	2	2	1	2	1	3	3
3	3	3	2	2	2	3	4	3	3	2	2	2	3	2	3
4	2	1	1	1	1	2	2	3	2	3	1	2	1	1	1
5	2	3	1	2	2	3	3	3		1	1	2	2	2	1

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Gaps in the syllabus (to meet Industry/Profession requirements):

Syllabus is framed according to industrial and professional requirement.

POs met through Gaps in the Syllabus:

NA

Topics beyond syllabus/Advanced topics/Design:

1. Application of GIS, GPS and RS in Disaster Management

POs met through Topics beyond syllabus/Advanced topics/Design:

2,4

Course Delivery Methods

CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Assignments/Seminars
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures
CD5	Industrial visits/in-plant training
CD6	Self- learning such as use of NPTEL materials and internets
CD7	Simulation

MAPPING BETWEEN COURSE OUTCOMES AND COURSE DELIVERY METHOD

Course Outcome	Course Delivery Method
CO1	CD1,CD2,CD8,
CO2	CD1,CD2,CD8
CO3	CD1,CD2, CD3,CD8
CO4	CD1,CD2, CD8
CO5	CD1,CD2

Annexure - VIII

MINOR IN CIVIL ENGINEERING

(Offered ONLY to OTHER department students)

Students who have registered for B. Tech Minor in Civil Engineering should complete 20 credits and shall opt for courses listed below.

Semester/Session of study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery & Credits			Total Credits C - Credits
					L	T	P	
Fifth Monsoon	Third	Theory						
		PC*	CE204	Building Materials & Construction	3	0	0	3
			CE313	Basic Structural Engg	3	0	0	3
			CE314	Basic Transportation Engg	3	0	0	3
		Sessional						
MC	CE205	Civil Engineering Drawing	0	0	4	2		
Total							8	
Sixth Spring	Third	Theory						
		PC*	CE209	Construction Engg & Mngmnt	3	0	0	3
			CE315	Basic Water Resources Engg	3	0	0	3
		Sessional						
		MC	CE212	Surveying Field Work	1	0	3	2
MC	CE213	Specifications Estimation and Costing	1	0	2	2		
Total							7	
Seventh Monsoon	Fourth	Theory						
		PC OE* OE*	CE404	Elements of Geotechnical Engg	3	0	0	3
			CE429	Disaster Management	3	0	0	3
			CE430	Environmental Management	3	0	0	3
Total							6	
GRAND TOTAL							21	
(Minimum requirement for minor degree award is 20)								

N.B. * Two theory courses out of three are compulsory in Fifth Level

* One theory course out of two is compulsory in Sixth Level

* One theory course (OE) out of two is compulsory in Seventh Level

COURSE INFORMATION SHEET

Course Code: CE 204

Course Title: BUILDING MATERIALS AND CONSTRUCTION

Pre-requisite(s): Basic Sciences

Co- requisite(s):

Credits: L: 3 T: 1 P: 0

Class schedule per week: 03

Class: B. Tech.

Semester / Level: 3RD SEMESTER/ LEVEL 2

Branch: Civil Engineering

Name of Teacher: Dr. Indrajit Roy

Course Objectives

This course envisions to impart to students to:

A.	To know the various types of building materials used in current construction practices and their associated manufacturing processes and properties
B.	To understand the choices designers, make in choosing building materials based on properties of these materials
C.	To get exposed to various quality control aspects of the civil engineering materials by performing different lab test on materials
D.	To understand the construction methodology of different substructure and superstructure components using various building materials

Course Outcomes

After the completion of this course, students will be able to:

1.	Able to explain the manufacturing process, physical and chemical properties and uses of various building materials
2.	Able to analyze the suitability of different building materials and significance in using those materials in relation with building's function
3.	Able to perform quality control tests on different construction materials
4.	Able to plan and execute construction of various components of substructure and superstructure

SYLLABUS

MODULE	(NO. OF LECTURE HOURS)
<p>Module – I Building Stones, Bricks Classification of rocks, Varieties of Indian stones, Quarrying blasting, Dressings of stones, Characteristics of good building stones, uses, Testing and Preservation of stones, Constituents of brick earth and their properties, Manufacture of bricks, clamps & kilns, types of brick, defects in bricks, tests on bricks.</p>	10
<p>Module – II Limes, Cements, Mortar, Timber Lime – Types, properties and uses. Cement – Composition, Varieties, Properties, Methods of manufacture; Tests on cement. Mortar-Lime mortar, Cement mortar, Surkhi mortar, Mud mortar, Gypsum and Plaster of Paris, Varieties of Indian timber, Characteristics and suitability for different uses, Defects in timber, Diseases and decay in timber, Preservation and Seasoning, Veneers, Fiber boards, Block boards; modern materials like fibre-reinforced plastics and introduction to composites.</p>	10
<p>Module – III Foundation, Masonry Foundations: functions and different types, basic terminologies associated with stone and brick masonry, types of stone masonry and brick masonry bonds, brick laying, types of walls, load bearing walls, design considerations; cavity walls: general features and construction; partition walls: brick, concrete and glass partitions.</p>	7
<p>Module – IV Concrete Technology, DPC and anti-termite works Concrete constituents, properties of concrete, batching, mixing, transporting, placing, compacting, curing of concrete; tests for quality control, different concrete mixes and uses; reinforcements in RCC; Design of Concrete Mixes: proportioning of aggregates and methods of mix design. Damp proofing: cause and effects of damping; materials and methods for damp proofing – D P C treatment. Anti-termite treatment.</p>	8
<p>Module – V Plastering and pointing, plumbing types Types of mortar for plastering, terminology, tools, methods of plastering, defects in plastering; methods of pointing. Plumbing - water supply service connection for buildings, different types of traps, types of drainage pipes and systems of plumbing for wastewater drainage.</p>	5

Text books:

1. Duggal S. K. : Building Materials (New Age International Publishers)
2. Punmia B.C., Jain A.K. and Jain A.K.: Building Construction (Laxmi Publications Pvt.Ltd)
3. Arora S.P. and Bindra S.P.: A Text Book of Building Construction (Dhanpat Rai Publications)

Gaps in the syllabus (to meet Industry/Profession requirements)

Design of real-time industrial projects.

Topics beyond syllabus/Advanced topics/Design

Case Study of a building Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	√
Tutorials/Assignments	√
Seminars	√
Mini projects/Projects	√
Laboratory experiments/teaching aids	√
Industrial/guest lectures	√
Industrial visits/in-plant training	√
Self- learning such as use of NPTEL materials and internets	√
Simulation	√

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4
Mid Sem Examination	√	√		
Examination	√	√	√	√
Quiz 1	√	√		
Quiz 2			√	√
Assessment/Assignment by Teacher	√	√	√	√

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1			1	2	2				2		2	2	3
2	2					2	2			1	2		3	3	3
3					1	2				1			3	3	3
4	2		2	1			2			2			3	3	3

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2 and CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2 and CD8
CD3	Seminars	CO3	CD1, CD2, CD5 and CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD6, CD7 and CD8
CD5	Laboratory experiments/teaching aids	CO4	CD1, CD2, CD6, CD7 and CD8
CD6	Industrial/guest lectures	CO4	CD1, CD2, CD6, CD7 and CD8
CD7	Industrial visits/in-plant training	CO4	CD1, CD2, CD6, CD7 and CD8
CD8	Self- learning such as use of NPTEL materials and internets	CO4	CD1, CD2, CD6, CD7 and CD8
CD9	Simulation	CO4	CD1, CD2, CD6, CD7 and CD8

COURSE INFORMATION SHEET

Course code: CE 313

Course Title: BASIC STRUCTURAL ENGINEERING

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Class: B. Tech

Semester / Level: LEVEL 3

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Understand the various types of structural systems. (K1, K2)
B.	Use the analytical tools to analyse the statically determinate and indeterminate structures. (K2, K3)
C.	Understand the physical characteristics of commonly used structural materials (K1, K2)
D.	Apply the process to capture the worst effect of combined load application during structural analysis. (K3, K4)
E.	Have familiarity with Indian design codes for steel and concrete structures (K2, K3)

Course Outcomes

After the completion of this course, students will be to:

1.	Analyse basic determinate and indeterminate structures. (K3, K4)
2.	Apply the properties of materials, with suitable combination of loads for structural analysis and design. (K1, K2, K3, K4)
3.	Perform basic design of steel and concrete structures as per IS code of practice. (K1, K2, K3, K4)

K1- Remember; K2- Understand; K3- Apply; K4- Analyse; K5- Evaluate; K6- Create

Syllabus

Module I: Structural systems & analysis of statically determinate structures

Classification of structures, Types of loads, Types of stress in structural members, Types of supports in structures, Deformation of structures under loading, Structural classification based on degree of indeterminacy, Bending moment and shear force, Analysis of pin jointed frames.

Module II: Analysis of Statically Indeterminate Structures

Structural classification based on the degree of indeterminacy (kinematic and static), Principle of superposition, Analysis of statically indeterminate beams.

Module III: Design Theories

Stress-strain relationship for different materials, Design philosophies, Combination of loads.

Module IV: Steel structure

Properties of structural steel, Steel structural sections, Basic design of steel structure for joints, tension members, compression members and beams as per limit state method.

Module V: Concrete structures

Concrete, Basic design of beam, one-way slabs, axially loaded short column as per limit state method.

Text books:

1. Bhavikatti, S.S, Structural Analysis, Vol.1, & 2, Vikas Publishing House Pvt.Ltd., New Delhi-4, 2014.
2. Krishnaraju.N “ Design of Reinforced Concrete Structures “, CBS Publishers & Distributors Pvt. Ltd., New Delhi.
3. Duggal. S.K, “Limit State Design of Steel Structures”, Tata McGraw Hill Publishing Company, 2005

Reference books:

1. IS: 456 - 2000, Code of practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, 2000
2. IS: 800 – 2007 Code of Practice for General Construction in Steel.
3. IS: 875 Part 1 to 5, Code of practice for design loads (other than Earthquake) for buildings and structures.
4. Teaching Resources for Structural Steel Design – Vol. I & II, INSDAG, Kolkatta

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz (s) (1 &2)	10+10
Teachers assessment	5

Assessment Components	CO1	CO2	CO3
Mid Sem Examination Marks	✓	✓	
End Sem Examination Marks	✓	✓	✓
Quiz 1	✓		

Quiz 2		✓	✓
Assignment	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3										2	2		
2	2	3	2			2		2				2	2		3
3	3	3	3			3		3	1	3		3	3	1	3

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD4, CD8
CD3	Seminars	CO3	CD2, CD4, CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 314

Course title: BASIC TRANSPORTATION ENGINEERING

Pre-requisite(s):

Co- requisite(s):

Credits: 3L:3T: 0 P: 0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 6TH SEMESTER/ LEVEL 3

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand the introduction and highway development in India (K1, K2)
B.	To analyse the highway alignment, survey and develop detailed project report (K4, K6)
C.	To understand the geometric design of highways and plan traffic management systems (K2, K4)
D.	To understand the useful materials for highway construction and execute construction of highways (K2, K6)
E.	To understand the concepts of geometric design of railway track and airport runway (K2,K4)

Course Outcomes

After the completion of this course, students will be:

A.	Able to understand the highway development planning in India (K1, K2)
B.	Able to analyse the highway alignment, survey and prepare detailed project report (K4, K6)
C.	Able to understand the geometric design of highways and plan traffic management systems (K2, K4)
D.	Able to understand the useful materials for highway construction and execute construction of highways (K2, K6)
E.	Able to understand the concepts of geometric design of railway track and airport runway (K2,K4)

Syllabus

I. Introduction and Highway Development in India:

Different modes of Transportation, Characteristics of Road Transport, Brief history and development of Road Construction, Jayakar Committee Recommendations, Road Classification, Long term Road Plans, Vision – 2021, NHDP, Rural Roads Development Plan

II. Highway Alignment, Survey and Detailed Project Report:

Fundamental Principles of Highway Alignment, Factors controlling the selection of alignment, Engineering Surveys for a Highway Project, Drawings, Preparation of Detailed Project Reports (DPR)

III. Geometric Design of Highways and Traffic Engineering:

Road Cross-sectional Elements: Width of Carriageway, Formation Width, Right of Way, Camber, Shoulder, Kerb, Road Margins, Design Speed, Sight Distances, Traffic characteristics, Traffic Studies, Traffic Volume, Traffic Forecast, Traffic Capacity, Traffic Control Devices, Parking Studies, Accident Studies, Highway Safety, Traffic Signs

IV. Highway Materials and Construction:

Subgrade Soil, Aggregates, Bitumen, Tar, Emulsion, Modified Bitumen, Cement Concrete, Tests on aggregates, Tests on Bitumen, Types of Pavements, Construction of WBM roads, Soil Stabilised Roads, Different types of Bituminous Constructions, Construction of cement Concrete Pavements, Equipments used in Highway Construction

V. Railway Engineering and Airport Engineering:

Location surveys and alignment, Permanent way, Gauge, Coning of Wheels, Function of Rails, Type of Rail sections, Wear on Rails, Rail Failures, Rail flaw detection, Creep of Rails, Rail Joints, Function of sleepers, Types of sleepers, sleeper density, Ballast, Rail Fixtures and Fastenings, Formation and Subgrade, Failures in rail embankment and measures, Aircraft characteristics, Runway, Taxiway, Aprons, Terminal Area

Text books/References books:

- i. Khanna S. K. and Justo C. E. G.: Highway Engineering
- ii. Chakraborty P. and Das A.: Principles of Transportation Engineering
- iii. Saxena S.C. and Arora S.P. : A Text Book of Railway Engineering
- iv. Khanna S.K., Arora, M.G. and Jain S.S.: Airport Planning and Design

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10+10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓			
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program outcomes												Program specific outcomes	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	3	2	2	3	2	3	2	3	3	3
2	3	3	3	3	3	2	2	3	2	3	2	3	3	3
3	3	3	3	3	3	3	2	3	2	3	2	2	3	3
4	3	3	3	3	3	2	3	2	3	2	2	3	3	3
5	3	3	3	3	2	2	3	2	3	2	2	3	3	3

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD5, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD5, CD8
CD3	Seminars	CO3	CD1, CD5, CD8
CD4	Mini projects/Projects	CO4	CD1, CD5, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD5, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 205

Course title: CIVIL ENGINEERING DRAWING

Pre-requisite(s):

Co-requisite(s): CE204

Credits: 2 L: 0 T: 0 P: 4

Class schedule per week: 4

Class: B. Tech

Semester / Level: 3RD SEMESTER/ LEVEL 2

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

A.	To introduce types of drawing and standard practices in drawing different components of the building.
B.	To introduce the students to draft the plan, elevation, and sectional views of buildings following development and control rules, satisfying orientation and functional requirements.

Course Outcomes

After the completion of this course, students will be able to:

1.	Apply various types of scales as per the need for preparing various types of drawings.
2.	Prepare, read, and interpret, component drawing, building drawings, and layout.
3.	Execute and supervise the construction work for buildings based on provided Engineering drawings.

List of experiments

- Types of drawing- Index map, key plan, village map, site plan, layout plan with appropriate scale & uses. Sizes of various standard papers.
- Symbols of Engineering materials, Electrical Installations, Water supply, and Sanitary fixtures.
- Different masonry bonds.
- Load-bearing wall and shallow Foundations.
- Plan, Elevation and Section of the residential building.
- Types of staircase, Plan and Section details.
- Detailed drawings of water supply and drainage connections to the building.
 - The layout of Single Storey Building Drainage System
 - The layout of Water supply in Single Storey Building
 - The layout of the Drainage system in Multi storeyed Building
- Student Activity: Visit a construction site and collect drawings for the project

Textbooks:

- Building Planning & Drawing – Kumaraswamy N., Kameswara Rao A., Charotar Publishing
- Civil Engg. Drawing and House Planning – Verma B. P., Khanna Publishers
- Building Drawing & Detailing – Balagopal & T.S. Prabhu, Spades Publishers
- Building Planning and Drawing – S.S .Bhavikatti & M.V Chitawadagi, I.K International Publishing House Pvt.Ltd

Reference books:

1. National Building Code, BIS, New Delhi

Gaps in the syllabus (to meet Industry/Profession requirements)**POs met through Gaps in the Syllabus****Topics beyond syllabus/Advanced topics/Design****POs met through Topics beyond syllabus/Advanced topics/Design**

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3
Progressive Evaluation Marks	✓	✓	✓
End Examination Marks	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2			3		3	2	3		3	3	2	3
2	3	3	2			3		3	3	3		3	3	3	3
3	3	3	2			3		3	3	3		3	3	3	3

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD5, CD8
CD2	Tutorials/Assignments	CO2	CD5, CD8
CD3	Seminars	CO3	CD4, CD5, CD7, CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids		
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 209

Course title: Construction Engineering and Management

Pre-requisite(s):

Co- requisite(s):

Credits: L: 3 T: 0 P: 0

Class schedule per week: 3

Class: B. Tech.

Semester / Level: 4th Semester/ Level 2

Branch: Civil Engineering

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Obtain knowledge about basics of construction project management and ethical conduct for engineers.
B.	Learn about construction economics.
C.	Know about construction planning.
D.	Learn construction contracts, and construction quality management.
E.	Learn project management information system.

Course Outcomes

After the completion of this course, students will be able to:

CO1.	Explain about construction project management and its relevance as well as ethical conduct of engineers.
CO2.	Make about economics of the construction project.
CO3.	Work with techniques like PERT and CPM.
CO4.	Prepare contract documents, carry out quality control of the project.
CO5.	Work with IT enabled Project Management Information System (PMIS).

SYLLABUS

MODULE	NO. OF LECTURE HOURS
Module 1. Introduction: Phases of a construction project, Construction project management and its relevance, Stakeholders of a construction project, Forms of business organizations, Important traits of a project coordinator, Ethical conduct for engineers.	8
Module 2. Construction Economics: Economic decision making, Time value of money, Cash-flow diagrams, Using interest tables, Present worth comparison, Future worth comparison, Annual cost and Worth comparison, Rate of return method, Effect of taxation on comparison of alternatives, Effect of inflation on cash flow.	10
Module 3. Construction Planning: Types of project plans- Time/ Manpower/ Material/ Construction equipment/ Finance plans. Work- Breakdown structure, Event and activity, Dummy activity, Fulkerson's rule, PERT- Time computations, Earliest expected time, Latest allowable time, Slack, Critical path; CPM – Networks, Time estimates, Start and Finish times of activity, Floats, Super critical activity, Critical activity, Sub critical activity, critical path.	10
Module 4. Construction Contract, Construction Quality Management: Contract document – Contract drawings, Specifications, General / Special conditions of contract, Bill of quantities; Classification of contracts - Separated/ Management/ Integrated/ Discretionary contracts; Bidding process – Pre- qualification, Notice inviting tender, Bid submission, Letter of intent, Work order, Agreement; Subcontracting. Construction quality, Inspection, Quality control and Quality Assurance in projects.	6
Module 5. Project Management Information System (PMIS): Importance of information in project context, PMIS framework, Project data structuring, Codification, Performance reporting, Trend analysis, Information communication /retrieval using IT applications, Project documents management, Factors affecting PMIS success.	6

Text books:

- Construction Project Management – Theory and Practice – Kumar Neeraj Jha, Pearson
- Project Planning and Control with PERT and CPM – B.C. Punmia & K.K. Khandelwal, Laxmi Publications (P) Ltd
- Construction Project Management – Planning, Scheduling and Controlling – K.K. Chitkara, McGraw Hill Education (India) Private Limited

Reference books:

1. Construction Management and Machinery – B.L. Gupta & Amit Gupta, Standard Publishers Distributors.

Gaps in the syllabus (to meet Industry/Profession requirements) : Nil

POs met through Gaps in the Syllabus: Nil

Topics beyond syllabus/Advanced topics/Design: Nil

POs met through Topics beyond syllabus/Advanced topics/Design: Nil

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2		1	3			2	2	3	2	3	3		1
CO2	3	3		1	3				2	2	3	3	3		
CO3	3	3		1	3				2	2	2	3	3	2	
CO4	2	2		1	2				2	2	2	3	2	2	2
CO5	3	3		1	3				2	2	2	3	3		

Correlation Levels 1, 2 or 3 as defined below

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD3, CD4, CD6, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD3, CD4, CD6, CD8
CD3	Seminars	CO3	CD1, CD2, CD3, CD4, CD6, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD3, CD4, CD6, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD3, CD4, CD6, CD7, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE315

Course title: BASIC WATER RESOURCES ENGINEERING

Pre-requisite(s):

Co-requisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 3

Class: B. Tech

Semester / Level: 5th SEMESTER / LEVEL 3

Branch: MINOR IN CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students:

A.	To acquire the knowledge of hydrology that deals with the occurrence, distribution and movement of water on the earth. (K1, K2)
B.	To understand the concepts of surface water and groundwater hydrology. (K2)
C.	To know about water distribution systems and their designing aspects. (K2)
D.	To analyse and design the dams and spillways. (K3, K4, K5)

Course Outcomes

After the completion of this course, students will be able to:

1.	Understand the interaction among various processes in the hydrologic cycle. (K1, K2)
2.	Investigate various processes of surface water hydrology. (K3, K4, K5)
3.	Understand and analyse the sub-surface hydrology and well hydraulics. (K2, K3, K4)
4.	Grasp the knowledge of water distribution systems and their various design aspects for an irrigation channel. (K2, K3, K4, K5)
5.	Analyse and design various dams, spillways and reservoirs. (K3, K4, K5)

Syllabus

Module I: Introduction

Hydrologic cycle, World water inventory, Water-budget balance equation, History of hydrology, Applications in engineering, Sources of data

Module II: Surface Water Hydrology

Precipitation, Evapotranspiration, Infiltration, Runoff, Hydrograph, Unit hydrograph, Floods and Flood Routing

Module III: Groundwater and Irrigation Engineering

Groundwater, Aquifers, Steady state flow in wells, Equilibrium equations for confined and unconfined aquifers, Water requirement of crops, Duty and Delta, Soil-water relationships, Root zone soil water, Irrigation methods

Module IV: Irrigation Canals

Irrigation canals, Design of alluvial canals, Kennedy's and Lacey's methods of canal design, Canal losses, Lined canals, Design of lined canals

Module 5: Dams and Reservoirs

Multipurpose projects, Dams, Earth dams, Gravity dams, Arch dams, Reservoirs

Text/Reference books:

1. Engineering Hydrology, K. Subramanya, Tata McGraw Hill.
2. Applied Hydrology, K. N. Muthreja, Tata McGraw Hill.
3. Water Resources Engineering through Objective Questions, K. Subramanya, Tata McGraw Hill.

4. Irrigation Engineering, G. L. Asawa, Wiley Eastern.
5. Water Resources Engineering, L. W. Mays, Wiley.
6. Irrigation, J. D. Zimmerman, John Wiley & Sons.
7. Engineering Hydrology, C. S. P. Ojha, R. Berndtsson and P. Bhunya, Oxford.

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self-learning such as use of NPTEL materials and internets	✓
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10+10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	✓	✓			
End Sem Examination	✓	✓	✓	✓	✓
Quiz 1	✓	✓			
Quiz 2			✓	✓	✓
Assessment/Assignment by Teacher	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	3	1	3	1	3	3	2	3
2	3	3	3	3	3	3	3	2	3	2	2	3
3	3	3	3	3	3	3	3	2	3	2	3	3
4	3	3	3	3	3	3	3	2	3	2	3	3
5	3	3	3	3	3	3	3	2	3	2	3	3

Mapping Between COs and Course Delivery (CD) methods

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD5, CD8
CD3	Seminars	CO3	CD1, CD2, CD4, CD5, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD4, CD5, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD4, CD5, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 212

Course title: SURVEYING FIELDWORK

Pre-requisite(s): CE 208 SURVEYING

Co-requisite(s):

Credits: 2 L: 0 T: 0 P: 4

Class schedule per week: 4

Class: B. Tech

Semester / Level: 4TH SEMESTER/ LEVEL 2

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Execute chain, compass survey.
B.	Perform plane table surveying.
C.	Carry out levelling works, take measurements by theodolite.
D.	Set out different types of curves.
E.	Learn about modern surveying instruments.

Course Outcomes

After the completion of this course, students will be able to:

1.	Perform chain, compass survey.
2.	Perform plane table surveying.
3.	Carry out levelling work, take measurement of angles with theodolite.
4.	Set different types of curves in the field.
5.	Handle modern instruments like Total Station, Auto Level, Digital Theodolite.

List of experiments

Fieldwork I: Perform survey for an area using chain and compass

Fieldwork II: Perform survey for an area using plane table.

Fieldwork III: Carry out profile leveling and cross-sectioning work along a road.

Fieldwork IV: Measurement of horizontal and vertical angles with a theodolite.

Fieldwork V: Set out horizontal curves on the field.

Fieldwork VI: Perform traversing using Total Station.

Fieldwork VII: Handling Digital Theodolites and AutoLevels.

Text books:

1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and 2, Laxmi Publications (P) Ltd.
2. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.

Reference books:

1. Duggal, S.K. "Surveying" – Vol. 1 and 2, Tata McGraw-Hill Companies, New Delhi.
2. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi.

Gaps in the syllabus (to meet Industry/Profession requirements)**POs met through Gaps in the Syllabus****Topics beyond syllabus/Advanced topics/Design****POs met through Topics beyond syllabus/Advanced topics/Design**

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure**Direct Assessment**

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	2	2	2		1	3	3	2		3	3	
2	3	3	2	2	2	2		1	3	3	2		3	3	
3	3	3	2	2	2	2		1	3	3	2		3	3	
4	3	3	2	2	2	2		1	3	3	2		3	3	
5	3	3	2	2	3	2		1	3	3	2		2	3	

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD6,CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD6,CD8
CD3	Seminars	CO3	CD1, CD2, CD6,CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD6,CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD6,CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 213

Course title: SPECIFICATIONS, ESTIMATION AND COSTING

Pre-requisite(s):

Co-requisite(s):

Credits: 2 L: 1 T: 0 P: 2

Class schedule per week: 3

Class: B. Tech

Semester / Level: 4TH SEMESTER/ LEVEL 2

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

A.	Understand the importance of estimation in civil engineering works and the different types of estimations and perform approximate estimation calculations.
B.	Understand the methodology for performing detailed estimations for building constructions.
C.	Understand the method for calculating reinforcement steel required in RCC works
D.	Understand how to analyse rates of different items of work
E.	Learn about writing specifications for different items of work.

Course Outcomes

After the completion of this course, students will be able to:

1.	Perform approximate estimate for a building to be constructed
2.	Perform detailed estimate for a building to be constructed.
3.	Calculate amount of reinforcement required in RCC works in a building construction.
4.	Perform rate analysis for various items of work.
5.	Fix specifications (and workmanship) required for the execution of different items of work.

Syllabus

Module I: Estimation Fundamentals

Importance of estimation, different types of estimates; Revised estimate, Supplementary estimate, how to prepare detailed estimate; abstract of estimate; contingencies; work-charged establishment; Tools & plants; market rate; lump-sum item, schedule of rates; substituted item, other definitions; general and detailed specifications. Importance of approximate estimate; methods of approximate estimation; approximate cost for water supply, sanitary and electrification works.

Module II: Detailed Estimation of Buildings

General items of work for building estimates; principal units for various items of work; limits of measurement and degree of accuracy in estimation; method/mode of measurement for different items of works commonly encountered in building construction; detailed estimates of a single roomed and a two roomed single storey residential building; estimation of an underground tank; symmetrical and unsymmetrical boundary walls; principle of estimate for a two-roomed building having different cross-sections to that of the main wall; principle of estimate of a single-roomed building with verandah dwarf wall and pillars having different cross-sections and when the same footing joins with several footings of the main wall.

Module III: RCC works and bar bending schedule

Measurement of materials; reinforcement; MS and TOR steel; binding wires; developmental length; end anchorage; hook and bend allowance; estimation of reinforcement bars in slabs, beams, columns, lintel and footing.

Module IV: Analysis of Rates

What is analysis of rates and how it is to be prepared; quantify of materials per unit rate of work; estimating labour; calculating quantity of materials required for different items of work; rate of materials and labour; material and other cost considerations. Market rates; Schedule of Rates. Rate analysis for different items of work commonly done in building construction.

Module V: Specification

Purpose, necessity of specification; how to write specifications; types of specifications; standard specification; special specifications; brief and detailed specifications and workmanship for common items of work in building construction.

Text books:

1. Chakraborty M., "Estimating costing and valuation in Civil Engg., Principle and applications (Authors Publication, Kolkata)
2. B.N. Dutta "Estimating & Costing in Civil Engineering," UBS Publishers & Distributors Pvt. Ltd. New Delhi.
3. CPWD Works Manual 2014 published under the authority of Director General CPWD.
4. CPWD Specifications 2009 published by Director General of Works, CPWD
5. CPWD DSR 2016 published by Director General of Works, CPWD

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2	3		1	3		3		3	3	3
2	3	3	3	2	2	3		1	3		3		3	3	3
3	3	3	3	2	2	3		1	3		3		3	3	3
4	3	3	3	2	2	3		1	3		3		3	3	3
5	3	1			1	3		1	3		3		2	3	3

Mapping Between COs and Course Delivery (CD) methods

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD6,CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD6,CD8
CD3	Seminars	CO3	CD1, CD2, CD6,CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD6,CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD6,CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE404

Course title: ELEMENTS OF GEOTECHNICAL ENGINEERING

Pre-requisite(s): None

Co- requisite(s): None

Credits: L: 3 T: 0 P:0 C:3

Class schedule per week: 3

Class: B. Tech

Semester / Level: 3

Branch: Minor in Civil Engineering

Name of Teacher

Course Objectives

This course enables the students:

A.	To understand soil as a naturally occurring construction material (K1, K2)
B.	To study how ground investigation is done (K1, K2, K3)
C.	To be familiar with problematic soils (K1, K2, K3, K4)
D.	To identify different methods for improving soil in situ (K1, K2, K3, K4, K5)
E.	To get introduced to earthquake geotechnical engineering (K1, K2, K3, K4)

Course Outcomes

After the completion of this course, students will be able to:

CO1.	Comprehend importance of soil as an engineering material
CO2.	Gain insight to site investigation exercise
CO3.	Identify difficult soils encountered at sites
CO4.	Select suitable techniques for different cases of ground improvement
CO5.	Conceptualise the phenomenon of ground shaking

SYLLABUS

Module I : Soil Formation & Composition

Origin of soil, process of weathering & formation of different soil types; soil minerals ; soil – water system, structure of soils, soil texture; size and range of soil particles; shapes of individual sand and clay particles

8 Lectures

Module II : Ground Investigation

Planning the ground investigation program ; methods of soil exploration; Groundwater observations ; Location, spacing and depth of borings, Overview of field tests, Soil samplers & collection of soil samples

8 Lectures

Module III : Difficult Soils

Weak & compressible soils; Expansive soils; Collapsible soils; Frozen soils; Corrosive soils

8 Lectures

Module IV : Ground Improvement

Improvement techniques; Surface compaction; Drainage methods, Vibration Methods; Pre compression & Consolidation; Grouting; Chemical stabilization; Soil Reinforcement, Case histories

8 Lectures

Module V : Geotechnical Earthquake Engineering

Earthquakes, ground shaking, liquefaction, surface rupture, permanent ground deformations & other related natural disasters; Earthquake force effect on soil structures

8 Lectures

Text books:

1. Murthy V.N.S. – Soil Mechanics & Foundation Engineering
2. Terzaghi & Peck – Soil Mechanics in Engineering Practice

Reference books:

1. Soil Mechanics & Foundations by Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain
2. Geotechnical Engineering by C. Venkataramaiah

Gaps in the syllabus (to meet Industry/Profession requirements)**POs met through Gaps in the Syllabus****Topics beyond syllabus/Advanced topics/Design****POs met through Topics beyond syllabus/Advanced topics/Design**

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	√
Seminars/Assignments	√
Laboratory experiments/teaching aids	√
Industrial/guest lectures	√
Industrial visits/in-plant training	√
Self- learning such as use of NPTEL materials & internets	√
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Mid Sem Examination Marks	25
End Sem Examination Marks	50
Quiz	10 + 10
Assignment	5

Assessment Components	CO1	CO2	CO3	CO4	CO5
Mid Sem Examination	√	√	√		
End Sem Examination	√	√	√	√	√
Quiz 1	√	√	√		
Quiz 2			√	√	√
Assessment/Assignment by Teacher	√	√	√	√	√

Indirect Assessment –

Student feedback on course syllabus & course outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	1	1	1	1	1	3	3	3	2	3	2	2	2
CO2	3	3	1	1	1	1	1	3	3	3	2	3	2	2	2
CO3	3	3	1	1	1	1	1	3	3	3	2	3	2	2	2
CO4	3	3	1	1	1	1	1	3	3	3	2	3	2	2	2
CO5	3	3	1	1	1	1	1	3	3	3	2	3	2	2	2

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs & Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD2	Tutorials/Assignments	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD3	Seminars	CO1 to CO5	CD1,CD2,CD3,CD5,

			CD6,CD7,CD8
CD4	Mini projects/Projects		
CD5	Laboratory experiments/teaching aids	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD6	Industrial/guest lectures	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD7	Industrial visits/in-plant training	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD8	Self- learning such as use of NPTEL materials & internets	CO1 to CO5	CD1,CD2,CD3,CD5, CD6,CD7,CD8
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE 429

Course title: DISASTER MANAGEMENT

Pre-requisite(s):

Co-requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule

per week: 3

Class: B.Tech.

Semester / Level: LEVEL 4

Branch: CIVIL ENGINEERING

Name of Teacher:

Course Objectives

This course enables the students to:

1.	Understand the disaster phenomenon and their implications in real life.
2.	Acquire knowledge of various risk reduction measures to reduce the impact of disasters.
3.	Know various structural and non-structural measures to prevent or mitigate impact of disasters.
4.	Aware of the various institutions, organizations or bodies which manage disaster occurrences.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand natural hazards and the disaster phenomenon along with their practical implications.
CO2	Know various disaster risk reduction techniques and disaster management process.
CO3	Understand the various meteorological disaster phenomena and know their preventive and remedial measures to reduce their impact in human lives.
CO4	Become aware of various topographical disaster phenomena, their affects and possible preventive or mitigative measures.
CO5	Create awareness among people and society regarding various biological and environmental disasters.

Syllabus

MODULE	(NO. OF LECTURE HOURS)
Module - I Introduction: Hazards and disasters, Distinction between hazard and disaster, History of disasters, Major trend, Characteristics and damage potential, Hazard assessment, Vulnerability, Vulnerability assessment, Classification of disasters, Types of disasters, Natural and man-made disasters, Causes, effects and practical examples of the disasters, Response time, Frequency.	6
Module - II Disaster Risk Reduction and Management: <i>Risk Management</i> : Risk, Risk assessment, Risk management, Risk reduction, Crisis Management.	6

<p><i>Disaster management:</i> Principle, Planning, Awareness, Prediction and forewarning, Disaster Management cycle, Pre- and post-management stage, Preparedness, Mitigation, Response, Recovery, Rehabilitation, Capacity building, Community capacity building, Disaster management in India,</p> <p><i>Institutional Organizations:</i> Disaster management act, National policy, Institutional framework, National and international organizations, NDMA, Responsibilities of NDMA, Nodal agencies, Disaster management strategies.</p>	
<p>Module - III</p> <p>Meteorological Disasters</p> <p><i>Floods:</i> Flood hazard and disaster, Flood hazards in India, Types of floods, Causes and effects, Flood management, Flood control and mitigation, Forecast and early warning.</p> <p><i>Drought:</i> Concept of drought, Impacts of drought, Consequences of drought, Types of drought, Drought profile, Drought hazards in India, Drought management, Drought risk reduction, Drought prediction and monitoring, Mitigation and prevention.</p> <p><i>Tsunami:</i> Tsunami wave characteristics, Tsunami Formation and evolution, Causes and effects, Identification and mapping, Protection, Warning system, Indian Ocean tsunami, Pre- and post- management of tsunami.</p> <p><i>Cyclone:</i> Characteristics, Occurrences, Distribution, Effects, Classification, Tropical cyclones, Cyclone reduction and management, Preparedness, mitigation and prevention.</p>	10
<p>Module - IV</p> <p>Topographical Disasters</p> <p><i>Earthquake:</i> Earthquake hazards/disasters, Earthquake characteristics, Plate tectonics, Causes of earthquakes, Distribution of earthquakes, Hazardous effects of earthquakes, Earthquake hazards in India, Epicenter, Hypocenter, Magnitude and intensity, Earthquake waves, Seismic zoning of India, Earthquake disaster reduction, Preparedness and mitigation, Rehabilitation, reconstruction and recovery.</p> <p><i>Volcanoes:</i> Volcanic hazard, Distribution, Causes and effects, Environmental impact, Risk and vulnerability, Management of volcanic disaster, Warning and prediction, Preparedness and mitigation, Rescue and relief.</p> <p><i>Landslides:</i> Meanings and concepts, Causes and effects, Types, Vulnerability and risk, Signs and early warning systems, Preparedness, prevention and mitigation.</p>	8
<p>Module - V</p> <p>Biological and Environmental Disasters</p> <p><i>Biological Disasters:</i> Biological hazards, Pathogen, Human, animal and plant epidemics, Mitigation and management, Safety and precautionary measures, Protection and control.</p> <p><i>Global Warming:</i> Evidence of global warming, Ozone depletion, Greenhouse effects, Effects of global warming, Global warming and climate change, Mitigation and remedial measures, Environmental laws.</p> <p><i>Fire:</i> Terminologies, Fire triangle, Fire resistance, Fire endurance, Fire detection and alarms, Fire safety, Prevention and mitigation measures</p>	8

Text books:

1. Disaster Science and Management, T. Bhattacharya, Tata McGraw Hill.
2. Disaster Management, M. Pandey, Wiley India Pvt. Ltd.
3. Natural Hazard and Disaster Management, S. C. Chakraborty.
4. Fire Safety in Building, V. K. Jain.

Reference books:

1. Manual on Disaster Management, National Disaster Management, Agency Govt. of India.

Gaps in the syllabus (to meet Industry/Profession requirements)

1. Engineering tools for disaster management
2. IS codes for disaster management

POs met through Gaps in the Syllabus

1,6,10

Topics beyond syllabus/Advanced topics/Design

Cyclone resistant structures and earth quake resistant design measures

POs met through Topics beyond syllabus/Advanced topics/Design

1,3,5

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
First Quiz	10
Mid Semester Examination	25
Second Quiz	10
Teacher's Assessment	5
End Semester Examination	50

Indirect Assessment

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	1	1	2	2	1	2	3	2	1	2	1	3	2	2
2	1	1	2	2	1	2	3	2	1	2	1	3	2	2
3	1	2	2	2	1	2	3	2	1	2	1	3	2	2
4	1	2	2	2	1	2	3	2	1	2	1	3	2	2
5	1	2	2	2	1	2	3	2	1	2	1	3	2	2

Correlation Levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Mapping Between COs and Course Delivery (CD) methods			
CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD5, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD5, CD8
CD3	Seminars	CO3	CD1, CD2, CD4, CD5, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD4, CD5, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD4, CD5, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

COURSE INFORMATION SHEET

Course code: CE430

Course title: ENVIRONMENT MANAGEMENT (OPEN ELECTIVE)

Pre-requisite(s): NA

Co- requisite(s): NA

Credits: L:2 T:0 P:0

Class schedule per week: 02

Class: B.Tech

Semester / Level: 03/01

Branch: All

Name of Teacher:

Course Objectives

This course enables the students:

1.	To develop basic knowledge and understanding of principles of environment and its application.
2.	To identify and understand the structure and composition of the environment and its management.
3.	To analyse, how the environment is getting contaminated and probable control mechanisms for them.
4.	To generate awareness about management laws and regulation in india so that they become a sensitive citizen towards the changing environment.

Course Outcomes

After the completion of this course, students will be:

CO 1	Able to explain the structure and function of ecosystems and their importance in the holistic environment.
CO 2	Able to identify the sources, causes, impacts and control of air pollution.
CO 3	Able to distinguish and analyse the various types of water pollution happening in the environment and understand about their effects and potential control mechanisms.
CO 4	Able to judge the importance of soil, causes of contamination and need of energy and waste management.
CO 5	Able to predict the sources of radiation hazards and pros and cons of noise pollution.

Syllabus

MODULE	(NO. OF LECTURE HOURS)
Module - 1 Environment and its components: Definition and components of Environment, Structure and Function of Environment, Levels of Organization in environment, Energy flow in environment, Food chain and Trophic level, Biogeochemical Cycles, Atmosphere: Composition and structure, terrestrial radiation, heat balance.	8

<p>Module – 2</p> <p>Water and soil management: Water in biosphere, Surface and groundwater, Water management, Rain water harvesting, Water shed management. Lithosphere: landforms and types, Soil as basic natural resource- Definition and Composition, Formation of Soil, Properties of soil, Soil erosion- Causes, Effects and Control measures. Aquaculture- Inland water resources and their economic potential with respect to fisheries.</p>	8
<p>Module – 3</p> <p>Environmental pollution and its impact: Air Pollution: Definition, Sources of air pollution. Air pollutants (CO, CO₂, SO₂, NO_x, Hydrocarbons & aerosols). Green House Effect, acid rain, Ozone layer depletion and Smog. Water Pollution: Definition and sources of water pollution. Specific phenomena related with water pollution- Algal bloom, Eutrophication, Biomagnifications/ Bioaccumulation. Land/ Soil Pollution: Definition, Sources of land/ soil pollution, Specific phenomena related with land/ soil pollution, Noise Pollution: Definition, Measurement of noise and its intensity. Types and classification of waste: Air, Liquid and Solid.</p>	8
<p>Module - 4</p> <p>EIA and Environmental Laws: Environmental Acts, Rules and Notifications. a) Water (Prevention & Control of Pollution) Act and the corresponding Rule, b) Water (Prevention & Control of Pollution) Act and the corresponding Rule, Air (Prevention & Control of Pollution) Act and the corresponding Rule d) Environment (Protection) Act and Rule. Concept of Sustainable Development, EIA: Steps in EIA, ISO 9000 and ISO 14000, Environmental Audit. Forest: Forest types, role of forest, Forest Management and Wildlife conservation.</p>	8
<p>Module - 5</p> <p>Energy Management: Conventional sources of energy: Coal, Oil and Natural gas, Thermal power, Firewood, Hydropower, Nuclear power. Non-Conventional Sources of Energy: Solar energy, Wind energy, Ocean/ Tidal energy, geothermal energy, Biomass based energy, Dendrothermal energy, Energy from urban waste, Bagasse based energy. Energy from refuse, recycling of waste materials. Forest: Forest types, role of forest, Forest Management and Wildlife conservation</p>	8

Text books:

1. A, K. De. (3rd Ed). 2008. Environmental Chemistry. New Age Publications India Ltd.
2. R. Rajagopalan. 2016. Environmental Studies: From Crisis to Future by, 3rd edition, Oxford University Press.
3. Eugene P. Odum. 1971. Fundamentals of Ecology (3rd ed.) -. WB Saunders Company, Philadelphia.
4. C. N. Sawyer, P. L. McCarty and G. F. Parkin. 2002. Chemistry for Environmental Engineering and Science. John Henry Press.
5. S.C. Santra. 2011. Environmental Science. New Central Book Agency.

Reference books:

1. D.W. Conell. Basic Concepts of Environmental Chemistry, CRC Press.
2. Peavy, H.S, Rowe, D.R, Tchobanoglous, G. Environmental Engineering, Mc-

Graw - Hill International

3. G.M. Masters & Wendell Ela. 1991. Introduction to Environmental Engineering and Science, PHI Publishers.

Gaps in the syllabus (to meet Industry/Profession requirements)

1. Recent trends and tools for pollution control
2. UN Initiatives for Environment and climate change mitigation

POs met through Gaps in the Syllabus

2,3,5,7

Topics beyond syllabus/Advanced topics/Design

1. IPCC reports and CDM initiatives
2. Pollution abatement technologies

POs met through Topics beyond syllabus/Advanced topics/Design

2,3,5,7

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Assessment Tool	% Contribution during CO Assessment
First Quiz	10
Mid Semester Examination	25
Second Quiz	10
Teacher's Assessment	5
End Semester Examination	50

Direct Assessment

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Course Objectives and Programme Outcomes

Course Outcome	Program outcomes (Pos)												Program specific outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1		1	3			1	3						1		
CO 2		1	3			1	3						1		
CO 3		1	3			1	3						1		
CO 4		1	3			1	3						1		
CO 5		1	3			1	3						1		

CD	Course Delivery methods	Course Outcome	Course Delivery Method
CD1	Lecture by use of boards/LCD projectors/OHP projectors	CO1	CD1, CD2, CD8
CD2	Tutorials/Assignments	CO2	CD1, CD2, CD8
CD3	Seminars	CO3	CD1, CD2, CD8
CD4	Mini projects/Projects	CO4	CD1, CD2, CD8
CD5	Laboratory experiments/teaching aids	CO5	CD1, CD2, CD8
CD6	Industrial/guest lectures		
CD7	Industrial visits/in-plant training		
CD8	Self- learning such as use of NPTEL materials and internets		
CD9	Simulation		

Annexure - IX

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DEPARTMENT OF MECHANICAL ENGINEERING
BIRLA INSTITUTE OF TECHNOLOGY
MESRA, RANCHI

August 21, 2020.

To
Dean, A.P.
B.I.T. Mesra
Ranchi

Mechanical Engg. Dept.
Ref No. 2317
Date of Issue 21.8.2020

Sub: Minutes of DAC Meeting.

Dear Madam,

Enclosed please find the Minutes of the DAC Meeting held on 21.8.2020 at 11.30 a.m. in the Department for your kind approval.

Thanking you,

Yours sincerely,

[Signature]
(Dr. R.P. Sharma)
Professor and Head

Head, Mech. Engg Dept
Approved.
Put up in Acd. Board.
for final approval.
[Signature]
25/8/20

Encl: Minutes of the DAC Meeting.

RECEIVED
No. 13530
21 AUG 2020
Dean (Academic Programmes) Office
B.I.T., Mesra

ISSUED
No. 5043
25 AUG 2020
Dean (Academic Programmes) Office
B.I.T., Mesra

DEPARTMENT OF MECHANICAL ENGINEERING
BIRLA INSTITUTE OF TECHNOLOGY
MESRA, RANCHI


August 21, 2020.

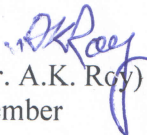
MINUTES OF DAC MEETING

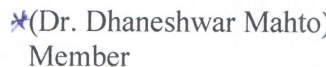
Meeting of the Departmental Academic Committee was held on August 21, 2020 at 11.30 a.m. to discuss about the scheme of study for Minor in Mechanical Engineering already offered under CBCS. Committee recommended that two more subjects may be offered to accommodate Production Engineering students willing to register in Minor offered by the Mechanical Engineering Department. This is for your kind approval.

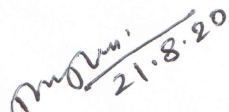
1. ME 203 Fluid Mechanics & Hydraulics Machines/ ME 353 Computational Fluid Mechanics.
2. ME 205 Strength of Materials/ ME 355 Advanced Solid Mechanics.

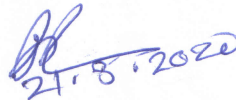
Signature of DAC Member:

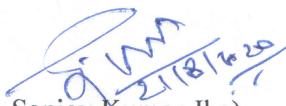

(Dr. D.P. Mishra)
Member

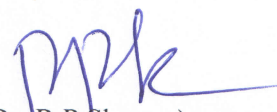

(Dr. A.K. Roy)
Member


*(Dr. Dhaneshwar Mahto)
Member


(Dr. Praveen Mishra)
Member


(Dr. P.R. Thakura)
Member


(Dr. Sanjay Kumar Jha)
Member


(Dr. R.P. Sharma)
Chairman,

* Absent

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be effective from academic session 2018- 19

Based on CBCS & OBE model
 Recommended scheme of study for
Minor in Mechanical Engineering

Semester/ Session of Study (Recommended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits L-Lecture; T-Tutorial; P-Practicals			Total Credits C- Credits
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
THEORY								
FIFTH Monsoon	SECOND	PC	ME201	Thermodynamics	3	0	0	3
			ME203	Fluid Mechanics & Hydraulic Machines	3	0	0	3
	LABORATORIES							
	SECOND	PC	ME202	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	1.5
TOTAL								
SIXTH Spring	SECOND	PC	ME205	Strength of Materials	3	1	0	4
	THIRD		ME301	IC Engines & Gas Turbines	3	0	0	3
	LABORATORIES							
	THIRD	PC	ME304	IC Engines Lab	0	0	3	1.5
TOTAL								
SEVENTH Monsoon	SECOND	PC	ME211	Machine Design	3	0	0	3
	LABORATORIES							
	FOURTH	PC	ME406	Computer Aided Design and Drafting Lab	0	0	3	1.5
TOTAL								
GRAND TOTAL								
<i>Minimum requirement for Minor degree award</i>								
20.5								

Annexure - X

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
B.I.T., MESRA, RANCHI**

Date: 22nd September '20

Notice

A Board of Studies (BOS) meeting will be held at 3.00PM on 28th September '20 through Google Meet regarding the renaming of courses of BCA and approval of syllabus of courses of MCA 2nd Semester and onwards.

All the members are requested to make it convenient to join the same. Dr. Shamama Anwar is requested to coordinate and share the meeting link.



(Dr. V. Bhattacharjee)
Prof. & Head

Copy to:

1. Dr. S. Dutta - Member
2. Dr. K. S. Patnaik - Member
3. Dr. A. Mustafi - Member
4. Dr. Sujan. K. Saha - Member
5. Dr. S. Pushkar - Member
6. Dr. Shamama Anwar - Member
7. Dr. A.K. Sinha - Member, CEE, Dean Student Welfare
8. Dr. Shradha Shivani - Member, Management and Head
9. Dr. Annapa B, Professor NITK Surathkal - External Member
10. Mr. Suparna Kanti Das, Scientist E DRDO, Kolkata - External Member
11. Faculty Members, CSE, Nominees of Director(s) BIT Off Campuses
(Patna, Deoghar, Jaipur, Noida and Lalpur)
12. Members of MCA/ BCA Syllabus Formation Committee
13. Dean(AP) for information
14. File

Department of Computer Science and Engineering, BIT Mesra

Minutes of Board of Studies meeting

A Board of Studies meeting was held on 28th September '20 for the approval and suggestions of the BOS members regarding the MCA syllabus (for courses of Semester II onwards) and renaming of some BCA courses. The meeting was also attended by Invited members of Department of Computer Science & Engineering, Main Campus and BIT off campuses, nominated by the competent authority.

For the MCA syllabus, the following main points were noted and agreed to by all members:

1. The MCA course structure and syllabus has been framed from the point of view of minimizing redundancy in the curricula.
2. The members appreciated the fact that the program elective groups were in concordance of the major thrust areas of the government of India's digital outlook i.e. in the domains of Computational Intelligence, IoT and Cloud Computing, High performance Computing and Computer Vision.
3. Dr. Annappa suggested the possibility of considering whether the Compiler Design paper proposed in IIIrd semester, MCA could be replaced by a paper on Cyber Security or Information Security and Compiler Design could be offered as a program elective. It was decided that this could be incorporated in the next iteration of the syllabus revision.
4. The feedback of MCA students were taken with positive response. The documents in support of their request and response are enclosed as Annexure I.
5. Suggestions with regard to the syllabus of certain courses like Basics of machine learning (suggested by Mr. Suparna Kanti das) were deliberated upon and incorporated to the satisfaction of all members.

The CBCS based course structure designed in 2018 for BCA course required some modifications in the existing scheme keeping in view of adopting GNU GPL software as per the National Policy on Information Technology, "Adopt open standards and promote open source and open technologies", Government of India, 2012. Adoption of open source software were suggested for Core and program electives Labs. The members approved that the proposed change in syllabus and hence the course title is necessary so as to adopt open source software in order to leverage economic and strategic benefits, and is given in the following table

Course Code and Present Course Title	Course Code and Proposed Course Title
PROGRAM ELECTIVE (SEC-IV) CA 380 TALLY SOFTWARE (ACCOUNTING AND FINANCETALLY ERP)	PROGRAM ELECTIVE (SEC-IV) CA 380 Computerized Accounting
CA 381 PHOTO SHOP LAB	CA 381 Graphic Design
PROGRAM ELECTIVE (SEC-II) CA 181 DESIGNING AND PUBLISHING IN COMPUTER USING PAGEMAKER, PHOTOSHOP AND CORELDRAW LAB	PROGRAM ELECTIVE (SEC-II) CA 181 Desktop Publishing
CA272 Soft Computing using MATLAB / SCI LAB	CA272 Soft Computing LAB

It was agreed to forward the approved MCA syllabus and changes in BCA courses to higher authority for further processing.

The meeting ended with a vote of thanks to all the attendees of the meeting. The HOD specially thanked the External members, Dr. Annappa and Mr. Suparna Kanti Das (from outside the Institute) and Dr. Anand Kr Sinha and Dr. Shraddha Shivani (from within Institute) for having spared their valuable time.

U. Bhaty
Arjun
Dr. Annappa
Dr. Anand Kr Sinha
Dr. Shraddha Shivani

Signatures of BoS members:

(Dr. Annappa)

(Mr. Suparna Kanti Das)

(Dr. Anand Kr. Sinha)

(Dr. S. Shivani)

(Dr. S. Dutta)

(Dr. K. Sridhar Patnaik)

(Dr. A. Mustafi)

(Dr. S. K. Saha)

(Dr. S. Pushkar)

(Dr. S. Anwar)

(CSE, I/C, BIT, Jaipur)

Anurag Joshi/Seema Sharma

(CSE, I/C, BIT, Noida)

(CSE, I/C, BIT, Patna)

(CSE, I/C, BIT, Deoghar)

(CSE, Academic Co-ordinator, BIT, Lalpur)

(HOD, CSE, BIT, Mesra Chairperson)

Department of Computer Science and Engineering, BIT Mesra

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PROGRAM ELECTIVE (SEC-II) CA 181 DESIGNING AND PUBLISHING IN COMPUTER USING PAGEMAKER, PHOTOSHOP AND CORELDRAW LAB	PROGRAM ELECTIVE (SEC-II) CA 181 Desktop Publishing
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Signatures of BoS members:

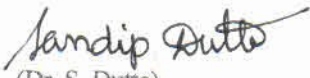


(Dr. Annappa)

(Mr. Suparna Kanti Das)

(Dr. Anand Kr. Sinha)

(Dr. S. Shivani)



(Dr. S. Dutta)



(Dr. K. Sridhar Patnaik)



(Dr. A. Mustafa)



(Dr. S. K. Saha)



(Dr. S. Pushkar)



(Dr. S. Anwar)


(CSE, I/C, BIT, Jaipur)

(CSE, I/C, BIT, Noida)

(CSE, I/C, BIT, Patna)

(CSE, I/C, BIT, Deoghar)

(CSE, Academic Co-ordinator, BIT, Lalpur)



(HOD, CSE, BIT, Mesra Chairperson)

Proposed Changes in BCA Syllabus

PROPOSED CHANGES IN BCA SYLLABUS

PROGRAM ELECTIVE (SEC-IV)

Course Code: CA380

Course Title: Computerized Accounting

Pre-requisite(s): Basic knowledge of Accountancy

Co- requisite(s): Knowledge of programming languages

Credits: 2 L:0 T:0 P:4

Class schedule per week: 04

Class: BCA

Semester / Level: V/3

Branch: Bachelor of Computer Applications

Name of Teacher:

Course Objectives

This course enables the students to:

A	Able to understand the basic concepts of Financial Packages
B	Learn the advantages of Financial Packages
C	To understand the structure of Financial Packages
D	To know the applications of Financial Packages
E	To understand the pros and cons of Financial Packages

Course Outcomes

After the completion of this course, students will be able to:

1	Able to write program
2	Able to solve real-time problem using Financial Packages
3	Able to analyze any logical and numerical problems using Financial Packages
4	Able to create a function using Financial Packages
5	Able to create an accounting software.

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Shamama Suparnakanti Das

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SYLLABUS

- 1 How would you configure Financial Data for a specific financial year?
- 2 How would you create a Ledger, Group?
- 3 How would you display, alter & delete Ledger ?
4. Describe the process of entering Vouchers
- 5 Describe the process of Payment, Receipt, Journal, Sales and Purchase order.
- 6 How would you display, alter and delete the Vouchers?
- 7 Describe the various options of reports.
- 8 Day Books Cash and Bank & Ledgers Books
- 9 How would you display Trail Balance, Profit & Loss Statement ?
- 10 How would you create Balance Sheet in columns and rows?
- 11 How would you cost categories with cost centers in Financial Packages.
- 12 Various options of shortcut or Function Key.
- 13 Various options printing reports in Financial Packages.
- 14 Understanding “by cash flow” and “fund flow” in Financial Packages.
- 15 Describe the Accounts with Inventory company in Financial Packages.
- 16 Create a Stock, Stock Unit & Alternate units, Stock Group & Stock Item
- 17 Describe the sales voucher, Sales invoice and purchase invoice.
- 18 How would you display stock group and stock item ?
- 19 How would you sales & purchase with tax Auto calculation?
- 20 Sales bill with auto discount using Financial Packages.
- 21 Creation of Employee payroll using Financial Packages.
- 22 How would you delete a company, Modify company using Financial Packages.

Text Books:

1. Real Accounting Software by A.K. Nadhani, BPB Publisher, 2003

Reference Books:

2. Computerized Accounting System by Manoj and Ajay, Sahitya Bhutan Publisher

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Course Code: CA381

Course Title: Graphic Design

Pre-requisite(s): Computer Graphics

Co- requisite(s): Knowledge of programming languages

Credits: 2 L:0 T:0 P:4

Class schedule per week: 04

Class: BCA

Semester / Level: V/3

Branch: Bachelor of Computer Applications

Name of Teacher:

Course Objectives


This course enables the students to:

A	Able to understand the basic concepts of Graphic Design and Photo Editing Packages.
B	Learn the advantages of Graphic Design and Photo Editing Packages.
C	To understand the structure of Graphic Design and Photo Editing Packages.
D	To know the applications of Graphic Design and Photo Editing Packages.
E	To understand the difference between different Graphic Design and Photo Editing Packages

Course Outcomes

After the completion of this course, students will be able to:

1	Able to analyze any photo using Graphic Design and Photo Editing Packages.
2	Able to apply use layer masks, filters and blending modes
3	Able to create, edit and work with text
4	Able to Design layouts for web pages, Paper Adverts, Brouchers, CD Covers, Package Designing
5	Able to create new layers and perform other basic layer functions


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SYLLABUS

- 1 Interface Graphic Design and Photo Editing Packages and workspace, Document setup width height & resolution.
- 2 What are the kinds of Tools in the toolbox? (Tool Palette and Interface - The Tool Palette - Painting and Editing - Custom Brushes)
3. Using selection tools, transform, marquee, crop, lasso, magic wand, eraser etc.(Basic Photo Corrections - Rotating, Scaling, and Distorting with Transformations - Feathering and Info Palette - Understand Resolution - Touch up Tools)
- 4 What are foreground and background colors?
- 5 How do you change the size of a picture?

Text Book:

GIMP Pocket Reference: Image Creation and Manipulation, by Sven Neumann, O'Reilly Publisher, 2000.

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Suparnakanti Das

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PROGRAM ELECTIVE (SEC-II)

Course Code: CA181

Course Title: Desktop Publishing.

Pre-requisite(s): C/C++; Knowledge of programming languages

Co- requisite(s):

Credits: 2 L:0 T:0 P:4

Class schedule per week: 04

Class: BCA

Semester / Level: II/1

Branch: Bachelor of Computer Applications

Name of Teacher:

Course Objectives

This course envisions to impart to students to:

A	Able to create a new document using Desktop Publishing software.
B	Learn the advantages of Desktop Publishing software.
C	To understand the idea of Desktop Publishing software.
D	To know the applications of Desktop Publishing software.
E	To understand the basic concepts of Desktop Publishing software.

Course Outcomes

After the completion of this course, students will be able to:

1	Identify the application of Desktop Publishing software
2	Apply the basic idea of Desktop Publishing software
3	To analyse a photo using Desktop Publishing software
4	Apply Desktop Publishing software to manage a page in better way
5	Create a template to solve a real time problem

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SYLLABUS:

INTRODUCTION

- i. Introduction to Desk Top Publishing packages, Components of Desk Top Publishing packages.

CREATING A NEW DOCUMENT

- ii. Setting the Margins, Setting the Page Size, Changing the page Orientation, Setting Page Numbers, Changing the Page Size view, Creating New Document Windows: Displaying the Rulers, Changing the Rulers, Using Rulers, Using Guidelines, Positioning Guidelines., Adding Guidelines to Master Pages. Aligning to Guidelines, Displaying Guidelines, Locking Guidelines. Formatting Types: Changing Font Families, Changing Font Sizes, Changing Typeface Style, Changing Character Specifications: Changing Type leading, Changing Character Widths, Changing Tracking, Changing Type Options. Saving Your Document: Saving a new Document, Saving an existing Document, Saving a Document as another document, Reverting to a Previously Saved Version. Developing Paragraphs: Typing Text, Adding special Characters to Text, Aligning Text. Formatting paragraphs: Changing Indents, Changing the space around Paragraphs, Changing paragraph Alignment, controlling How Paragraphs Break Between Pages and Columns, Adding lines Above or Below Your Paragraphs.

2 INTRODUCTION TO CREATING FRAMES

- i. Converting Other Objects to Frames, Threading and Unthreading Text. Threading additional Text, Threading Text to Different Page, Unthreading Text Blocks, Rethreading Text Blocks, Making Text Blocks Disappear Without Deleting them, Selecting and Dragging Text, Editing Deleting Text, Cut, Copying, Pasting Text, Viewing the Contents of Clipboard, Using Undo and Revert. Inserting and Removing Pages: Inserting and Removing Pages, Adjusting Spacing of Characters, Words, Lines Adjusting, Spacing and Leading, Setting and changing Tabs.
3. Introduction to Auto Flow, page maker Plug-Ins, Drop Cap, Change Case, Bullets and Numbering.

4 ADDING DESIGN ELEMENTS-INTRODUCTION

- i. Adding Graphics to your Document, Adding Lines, Changing Lines Specifications, Adding Shapes, changing Shape specifications, Changing Line and fill, Specifications together (Fill and Stroke), Changing Round Corners, Creating Drop-Shadow, Boxes, Text wrap, Changing page maker Options:

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Suparnatani Das

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Adjusting Margins, Setting and Adjusting Columns, Setting Unequal Width Columns, Creating headers and Footers, Creating Graphics in page maker, Rotating Text, Skewing and Mirroring objects with Control Palette. Importing Graphics into page maker: Placing, Sizing, aligning Graphics, Cropping Graphics.

5. **SETTING UP TEMPLATES**

- i. Setting Up Master Page Templates, Creating Custom Page Sizes, Creating Custom Borders, Creating a News Paper Template, Creating New master Pages, Saving an existing Page As a Master Page. Setting UP Custom Styles: Defining Styles, Creating, Editing, Removing Styles and Copying Styles.

Lab Section [each Day 50 mints x 2 = 100 mints]

- 1 Installation of Operating Systems
- 2 Working with Windows Operating system.
- 3 Get familiar with Linux Operating.
- 4 Lab on open office.
- 5 Document formatting in word/Mail Merge
- 6 Printing in Word.
- 7 Lab on spreadsheet.
- 8 Formatting data on spreadsheet
- 9 Working with Multiple worksheet/Formulas/Sorting /Filtering
- 10 Configuration of Samba Server.
- 11 File configuration.
- 12 Introduction to Desk Top Publishing.
- 13 Creating documents using photo editing packages.
- 14 Lab on photo editing packages

TEXT BOOK

- 1., “Computer Basics with office Automation” by Kumar Archana, IK International Publishing, 2010, ISBN 9789380578620.

REFERENCE BOOK

1. “BPB's Office 2010 Course Complete Book For Learning Better And Faster” by Prof. Jain Satish, Kratika, Geetha M., BPB publisher.
2. Desktop publishing by B Kumar, BPB Publisher.

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Shamama Suparnakanti Das

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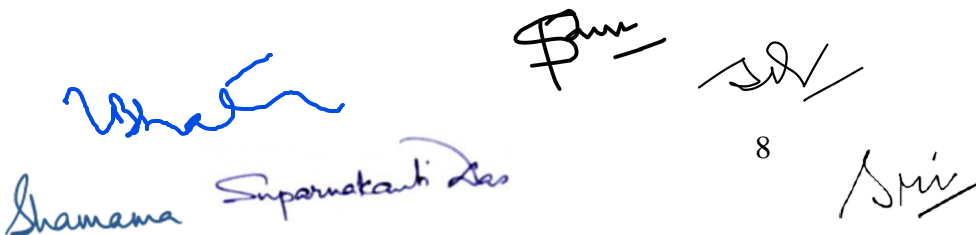
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Course Code: CA272

Course Title: Soft Computing LAB

1. Implementation of Fuzzy Operations.
2. Implementation of Fuzzy Relations (Max-min Composition).
3. To implement De-Morgan's Law.
4. To plot various membership functions.
5. Implementation of Simple Neural Network.
6. Write a program to generate a few activation functions that are being used in neural networks.
7. Write a program for perceptron net for an AND function with bipolar inputs and targets.
8. Implementation of Perceptron Learning Algorithm.
9. Implementation of Unsupervised Learning Algorithm.
10. Implementation of Simple Genetic Applications.

**Note: At Lab GNU General Public License (GNU GPL)
Software would be promoted.**

The bottom of the page features several handwritten signatures in blue ink. From left to right, there is a signature that appears to be 'Shamama', followed by 'Suparnakanti Das', a signature that looks like 'Bun', a signature that looks like 'SDV', the number '8', and a signature that looks like 'Sri'.

MCA Syllabus

PROGRAMME COURSE STRUCTURE (ALL SEMESTERS)

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE –Proposed from Monsoon 2020
Based on CBCS & OBE model
Recommended scheme of study for MCA Programme

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/ week)	T (periods/ week)	P (periods/ week)	
Theory								
First/ Monsoon	FOURTH	Programme Core(PC)	CA403	Computer Organization & Architecture	3	0	0	3
	FOURTH	Programme Core (PC)	CA405	Data Structures and Algorithms	3	0	0	3
	FOURTH	Programme Core (PC)	CA407	Database Design Concepts	3	0	0	3
	FOURTH	Programme Core (PC)	CA409	Object Oriented Design using Java	3	0	0	3
	FOURTH	Programme Core (PC)	CA411	Modern Operating Systems	3	0	0	3
	FIRST	Humanities & Social Sciences	MT123	Business Communication	2	0	2	3
Laboratories								
	FOURTH	Programme Core (PC)	CA406	Data Structures and Algorithms Lab	0	0	3	1.5
	FOURTH	Programme Core (PC)	CA408	Database Design Concepts Lab	0	0	3	1.5
	FOURTH	Programme Core (PC)	CA410	Object Oriented Design using Java Lab	0	0	3	1.5
		Total						

Suparnika Das

Dr. S. S. S. S.

Ushata Shamana

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/ week)	T (periods/ week)	P (periods/ week)	
Theory								
Second/ Spring	FIRST	HSS	MT114	Fundamentals of management & Organization Behaviour	3	0	0	3
	FOURTH	Programme Core(PC)	CA413	Data Communication & Computer Networks	3	0	0	3
	FOURTH	Programme Core(PC)	CA415	Software Engineering Principles	3	0	0	3
	FOURTH	Programme Core(PC)	CA417	Theory of Computation	3	0	0	3
	FOURTH	Programme Core(PC)	CA419	Analysis of Algorithms	3	0	0	3
	FOURTH	Program Elective	-	Program Elective - I	3	0	0	3
Laboratories								
	FOURTH	Programme Core (PC)	CA414	DCCN Lab	0	0	3	1.5
	FOURTH	Programme Core (PC)	CA416	Software Engineering Lab	0	0	3	1.5
	FOURTH	Programme Core (PC)	CA422	IT Tools & Techniques Lab	0	0	3	1.5
	Total							

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/ week)	T (periods/ week)	P (periods/ week)	
Theory								

Suparnika Das

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Usha *Shamama*

Third/ Monsoon	FIFTH	Programme Core (PC)	CA511	Basics of Machine Learning	3	0	0	3
	FIFTH	Programme Core(PC)	CA513	Compiler Design	3	1	0	4
	FIFTH	Programme Core (PC)	CA515	Soft Computing	3	0	0	3
	FIFTH	SIT / Soft Skill Course / Extra OE	CA550	Small Industrial Training/ Small Project/MOOC				6
	FIFTH	Program Elective	-	Program Elective - II	3	0	0	3
	FIFTH	Program Elective	-	Program Elective - III	3	0	0	3
Laboratories								
	FIFTH	Programme Core (PC)	CA512	Basics of Machine Learning Lab	0	0	3	1.5
	FIFTH	Programme Core (PC)	CA514	Compiler Design Lab	0	0	3	1.5
	Total							25

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/ week)	T (periods/week)	P (periods/week)	
Project								
Fourth/ Spring	FIFTH	Project	CA590	Project				20
Total								20

Total Credits: 90

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List of Program Electives

PE/ LEVEL		Course Code	Name of the PE courses	L	T	P	Credit
4	PE1	CA431	Distributed Databases Concepts	3	0	0	3
4		CA433	Intrusion Detection System	3	0	0	3
4		CA435	Modern Artificial Intelligence	3	0	0	3
4		CA437	Information Retrieval	3	0	0	3
4		CA439	Image Processing	3	0	0	3
4		CA441	Data Mining Techniques	3	0	0	3
5	PE2	CA519	Mobile Computing	3	0	0	3
5		CA521	Cyber Security	3	0	0	3
5		CA523	Cloud Computing	3	0	0	3
5		CA525	Deep Learning	3	0	0	3
5		CA527	Computer Vision	3	0	0	3
5		CA529	Network Security & Cryptography	3	0	0	3
5	PE3	CA539	Parallel Computing	3	0	0	3
5		CA541	Digital Forensic	3	0	0	3
5		CA543	Internet of Things (IOT)	3	0	0	3
5		CA545	Natural Language Processing	3	0	0	3
5		CA547	Big Data Analytics	3	0	0	3
5		CA549	Block Chain Technology	3	0	0	3

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MCA Syllabus

Program Core Semester I

Course code: CA403

Course title: COMPUTER ORGANIZATION AND ARCHITECTURE

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: I/4

Branch: Master of Computer Applications

Name of Teacher:

Course Objectives

This course enables the students to:

1.	To provide knowledge of Computer Architecture
2.	Employ knowledge of various Digital Logic Circuits, Data Representation, Register and Processor level Design and Instruction Set architecture
3.	To develop the logical ability to Determine which hardware blocks and control lines are used for specific instructions
4.	Understand memory organization, I/O organization and its impact on computer cost/performance.
5.	Know merits and pitfalls in computer performance measurements.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Describe the merits and pitfalls in computer performance measurements and analyze the impact of instruction set architecture on cost-performance of computer design
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CO2	Explain Digital Logic Circuits, Data Representation, Register and Processor level Design and Instruction Set architecture
CO3	Solve problems related to computer arithmetic and Determine which hardware blocks and control lines are used for specific instructions
CO4	Design a pipeline for consistent execution of instructions with minimum hazards
CO5	Explain memory organization, I/O organization and its impact on computer cost/performance.

SYLLABUS

Module I:

INTRODUCTION

Digital Logic Design: Axioms and laws of Boolean algebra, Reduction of Boolean expressions, conversion between canonical forms, Karnaugh map (4 variable), Half Adder, full adder, 4-bit parallel parity bit generator, checker circuit, Decoder, Encoder, Multiplexer, IC RAM, ROM, Memory Organization, Sequential Circuits, State transistors, Flip-flop, RS, JK, D-Latch, Master-slave.

(8L)

Module II:

INSTRUCTION SET ARCHITECTURE

Memory Locations and Addresses: Byte Addressability, Big-Endian and Little-Endian Assignments, Word Alignment, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Subroutines, Additional Instructions, dealing with 32-Bit Immediate Values.

(8L)

Module III:

BASIC PROCESSING UNIT & PIPELINING

Basic Processing Unit: Some Fundamental Concepts, Instruction Execution, Hardware Components, Instruction Fetch and Execution Steps, Control Signals, Hardwired Control, CISC-Style Processors.

Pipelining: Basic Concept, Pipeline Organization, Pipelining Issues, Data Dependencies, Memory Delays, Branch Delays, Pipeline Performance Evaluation.

(8L)

Module IV:

MEMORY ORGANIZATION

Basic Concepts, Semiconductor RAM Memories, Read-only Memories, Direct Memory Access, Memory Hierarchy, Cache Memories, Performance Considerations, Virtual Memory, Memory Management Requirements, Secondary Storage

(8L)

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Module V:

INPUT OUTPUT & PARALLEL PROCESSING

Basic Input Output: Accessing I/O Devices, Interrupts, Input Output Organization: Bus Structure, Bus Operation, Arbitration, Interface, Interconnection Standards.

Parallel Processing: Hardware Multithreading, Vector (SIMD) Processing, Shared-Memory Multiprocessors, Cache Coherence, Message-Passing Multicomputers, Parallel Programming for Multiprocessors, Performance Modeling.

(8L)

Books recommended:

TEXT BOOK

1. Hamacher Carl, et. al, “Computer Organization and Embedded Systems”, 6th Edition, Tata McGraw Hill, New Delhi, 2011.(T1)
2. Patterson David A., “Computer Organization and Design: The Hardware Software / Interface”, 5th Edition, 1994.(T2)
3. Mano M. Morris, “Computer System Architecture”, Revised 3rd Edition, Pearson Education.(T3)

Course code: CA405

Course title: Data Structures and Algorithms

Pre-requisite(s): High Level languages like C, C++, Java or Python

Co- requisite(s): Data Structures Lab

Credits:4 L: 3 T: 1 P: 0

Class schedule per week: 4

Class: MCA

Semester / Level: I/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To provide knowledge of practical implementations and usage of Data Structures and Algorithms.
2.	Employ knowledge of various data structures during construction of a program.
3.	To develop the logical ability to store and retrieve data efficiently.
4.	To develop an appreciation of graph theory-based solutions for real life problems.
5.	Design and construct object-oriented software with an appreciation for data abstraction.

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Course Outcomes

After the completion of this course, students are expected to

CO1	Identify various data structures and their usages.
CO2	Apply data structures in the modeling of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design.
CO3	Demonstrate the usage of optimal trees, heaps and priority queues.
CO4	Implement sorting algorithms.
CO5	Develop programs using algorithms in graph theory.

SYLLABUS

Module I:

Fundamental Data Structures: Using Arrays, Singly Linked Lists, Circularly Linked Lists, Doubly Linked Lists, Asymptotic Analysis.

(8L)

Module II:

Stacks, Queues, Dequeues: The Stack, Queue, Dequeue ADTs, Simple Array Based Stack, Queue, Dequeue Implementation, Implementing Stack, Queue with Singly Linked List, Reversing an Array using Stack, Matching Parenthesis and HTML tags, A Circular Queue.

(8L)

Module III:

Trees: General Trees, Binary Trees, Implementing Trees, Tree Traversal Algorithms, BinarySearch Trees, AVL Trees, B Trees.

(8L)

Module IV:

Sorting: Merge sort, Quick sort, Studying sorting through algorithmic lens, Comparing Sorting Algorithms.

Heap: Priority Queues, Array Implementation of Heaps, Construction of Heaps, Heap Sort.

(8L)

Module V:

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Graphs: Data Structures for graphs, Graph Traversals, Transitive Closure, Directed Acyclic Graphs, Shortest Paths, Minimum Spanning Trees. (8L)

Text book:

1. Goodrich Michael T., Tamassia Roberto, Goldwasser Michael H. “Data Structures and Algorithms in Java”, Wiley, 6th Edition, 2014.
2. Klein Shmuel Tomi, Basic Concepts in Data Structures, Cambridge University Press, 1st Edition, 2016.

Reference books:

1. YedidyahLangsam, Moshe Augenstein J., Tenenbaum Aaron M. “Data Structures using JAVA”, Pearson Education, 2009.
2. Brass Peter “Advanced Data Structures”, Cambridge University Press, 1st Edition.

Course code: CA407

Course title: Database Design Concepts

Pre-requisite(s):

Co-requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 4

Class: MCA

Semester / Level: I/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To observe that how the real world data is stored, retrieved, and communicate under the DBMS environment
2.	To design a logical model which having the unique relation between the Data.
3.	To apply the query for the modification of the system.
4.	To develop a conceptual design which allows as to avoid anomalies in superior’s data.
5.	To discuss a system which allows to restrict the uncontrolled exaction and provide rigorous variation of the task.

Course Outcomes

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After the completion of this course, students will be able to:

CO1	Describe various data models and schemas used in database management systems.
CO2	Explain the fundamental concepts, data definitions and query processing tasks in relational query languages.
CO3	Recognize database design theory, and evaluate functional dependencies and normal forms in databases.
CO4	Formulate the operations of transaction and concurrent query processing tasks to obtain the correct results even under strict time constraints.
CO5	Interpret the foundational concepts of distributed databases. Illustrate several techniques related to transaction management and query processing in distributed database management systems.

SYLLABUS

MODULE I:

Introduction and Conceptual Modelling: Purpose of Database Systems, Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database languages, Database Architecture, Classification of DBMS, relational database, Database users and Administrators, Advantages of DBMS. Entities and Entity Sets, Relationships and Relationship Sets, Keys, Mapping, Constraints, ER Diagram, Reducing ER Diagram to tables, Generalization and Specialization, Aggregation.

(8L)

MODULE II:

Relational Model: Concepts, Constraints, Languages, Design and Programming: Relational database Schemas, Relational Algebra, Relational Calculus (Tuple Relational calculus and Domain Relational calculus), Update operations, Transactions, Dealing with constraint violations. Binary Relational operation: JOIN and DIVISION, SQL, More complex SQL Queries, Security & Integrity violations, authorization and views, integrity constants, encryption, Statistical databases

(8L)

MODULE III:

Database Design Theory and Methodology: Pitfalls in relational database design, Functional Dependencies, Decomposition Using Functional Dependencies. Normalization using functional Dependencies, General Definition of First, Second, Third and Forth Normal Form. Boyce-Codd Normal Form(BCNF), Multivalued and join dependencies, DKNF.

(8L)

MODULE IV:

Transaction Processing Concepts and Concurrency Control Techniques: Transaction Processing, Desirable Properties of Transactions, Transaction State, Characterizing Schedules

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based on Recoverability and Serializability. Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Deadlock Handling, Recovery and Atomicity, Log-Based Recovery.

(8L)

MODULE V:

Distributed Databases and Client-Server Architectures: Concepts and Types of Distributed databases, data fragmentation, Replication and Allocation Techniques for Distributed Database Design, Query Processing in Distributed Databases, Overview of Concurrency Control and Recovery in Distributed Databases, An Overview of 3-Tier Client-Server Architecture.

(8L)

Text Book:

1. Elmasri Ramez, & Navathe S.B., “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2006.

Reference Book:

1. Silberschatz A., &Korth H., “Database Systems Concepts”, 5th Edition, McGraw Hill Higher Education, 2005.

Course code: CA409

Course title: OBJECT ORIENTED DESIGN USING JAVA

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 3

Class: MCA

Semester / Level: I/4

Branch: MCA

Course Objectives

This course enables the students:

1.	The course shall allow students to understand the basic tenets of OOP.
2.	The course will exemplify the basic syntax and constructs of JAVA

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3.	The course will help students understand the application OOP principles and Improve their programming skills in core Java
4.	The course will explain basic JAVA characteristics and their working.
5.	The course aims to expose students to Use the Java packages, applets for software development

Course Outcomes

After the completion of this course, students will be:

CO1	Identify the difference between procedural and OO programming.
CO2	Construct programs using various OOP principles.
CO3	Apply the knowledge gained for their project work as well as to develop some GUI applications using JAVA
CO4	Operate on files and strings in real life scenarios.
CO5	Analyze thread performance and inter thread communication issues

SYLLABUS

MODULE I:

Procedure-Oriented Programming, Object-Oriented programming, Benefits of OOP, Applications of OOP, Basics, Evolution of Java, Structure of JAVA Program, Simple Java Program, Tokens, Comments, Identifiers, Operators, Literals, Control Structures. Java Environment Setup, Compiling a Java Program, Java Virtual Machine, Philosophy of Java and Benefits.

(8L)

MODULE II:

Data types and program statements: Primitive and reference data types, variables and constants, enumerated constants, labelled statement, expression and null statements, compound statement, control statement – decision and loops, jump statement, declaration statement, try-catch-finally statement, declaring and creating arrays, accessing array elements, assigning values to array elements, multidimensional arrays.

(8L)

MODULE III:

Functions, Data Abstraction and classes: Declaration, definition and call, main method arguments, reference variables, method overloading, parameter passing by value for primitive types, object references and arrays, scope of variables, return from methods.

Class and object, class members and initialization, access rights of members – public, private and protected access modifiers, constructor and copy constructor, mutability, finalization, dynamic

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memory management, garbage collection, this keyword, static members, scope of variables, interface – declaration, implementation and extending, package and package visibility.

(8L)

MODULE IV:

Inheritance and Collection classes: multi level and single inheritance, multiple inheritance of interfaces, Object class, access rights in subclasses and packages, constructor calling sequence, super keyword, dynamic binding of methods, abstract class, overriding, shadowing and hiding, finalize, association, aggregation and composition.

String, StringBuffer, Date, Calendar, Math, Object, Class, Exception class.

(8L)

MODULE V:

Input/Output and JAVA Applets: Stream classes – InputStream, OutputStream, Buffered Stream, file classes and handling, pushback streams, reader and writer classes, file reader and writer, serialization.

Applet code example, HTML tags for applet, applet lifecycle, color, font and basic GUI handling, basic graphics, animation.

(8L)

Text books:

E. Balagurusamy - Programming in Java, 2nd Edition; Tata McGraw Hill Publication; New Delhi.

Reference books:

Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.

Dietel, Dietel - Java How to program , 7th edition; Pearson Education , New Delhi.

Course code: CA411

Course title: Modern Operating Systems

Pre-requisite(s): Data Structure, Computer System Architecture, Basic Course on Computer Programming

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

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Semester / Level: I/4
Branch: MCA

Course Objectives

This course enables the students to:

1.	Present the main components of OS and their working
2.	Introduce the concepts of process and thread and their scheduling policies
3.	Introduce the various memory management techniques.
4.	Analyze the different techniques for managing memory, I/O, disk and files.
5.	Introduce the security and protection features of an Operating System.

Course Outcomes

After the completion of the course student will be able to:

CO1	Describe the main components of OS and their working
CO2	Explain the concepts of process and thread and their scheduling policies
CO3	Explain the various memory management techniques.
CO4	Compare the different techniques for managing memory, I/O, disk and files.
CO5	Explains the security and protection features of an Operating System.

SYLLABUS

MODULE I:

Overview of Operating Systems: OS and the Computer System, Efficiency, System Performance and User Convenience, Classes of Operating Systems, Batch Processing Systems, Multiprogramming Systems, Time Sharing Systems, Real Time Operating Systems, Distributed Operating Systems, Modern Operating Systems.

(8L)

MODULE II:

Processes and Threads: Processes and Programs, Programmer view of Processes, OS view of Processes, Threads, Case studies of Processes and Threads.

Scheduling: Preliminaries, Non-preemptive Scheduling Policies, Preemptive Scheduling Policies, Scheduling in Practice, Real Time Scheduling, Scheduling in Unix, Scheduling in Linux, Scheduling in Windows, Performance Analysis of Scheduling Policies.

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MODULE III:

Memory Management: Managing the Memory Hierarchy, Static and Dynamic Memory Allocation, Memory Allocation to a Process, Reuse of Memory, Contiguous Memory Allocation, Noncontiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Kernel Memory Allocation, A Review of Relocation, Linking and Program Forms.

Virtual Memory: Virtual Memory Basics, Demand Paging, Page Replacement Policies, Memory Allocation to a Process, Shared Pages, Memory Mapped Files, Unix Virtual Memory, Linux Virtual Memory, Virtual Memory using Segmentation.

(8L)

MODULE IV:

File Systems: File System and IOCS, Files and File Operations, Fundamental File Organizations, Directory Structures, File Protection, Interface between File System and IOCS, Allocation of Disk Space, Implementing File Access, File Sharing Semantics, File System Reliability, Virtual File System, Unix File System, Linux File System, Windows File System, Performance of File Systems.

(8L)

MODULE V:

Security and Protection: Overview of Security and Protection, Goals of Security and Protection, Security Attacks, Formal and Practical aspects of Security, Encryption, Authentication and Password Security, Access Descriptors and the Access Control Matrix, Protection Structures, Capabilities, Unix Security, Linux Security, Windows Security.

(8L)

Text Book:

1. Dhamdhare D.M., "Operating Systems: A Concept-Based Approach", 2nd Edition, TMH, New Delhi, 2006.

Reference Books:

1. Silberschatz A., Galvin Peter B., Greg Gagne, "Operating System Concepts", 6th Edition, John Wiley, Indian Reprint, 2003.
2. Crowley C., "Operating Systems: A Design-Oriented Approach", TMH, New Delhi, 2002.
3. Deitel H.M., "Operating Systems", 2nd Edition, Pearson Education, 2003.
4. Tanenbaum A.S., "Operating System: Design and Implementation", PHI, New Delhi, 2002.

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Importance and Objectives of Business communication, Process of communication, Barriers to effective communication, Techniques of effective communication. Forms of communication (Written, Oral, audio-visual communication).

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Module II:

Managing Business Communication:

Formal and Informal communication, Non- verbal communication (Body language, Gestures, Postures, Facial expressions). The cross-cultural dimensions of business communication. Techniques to effective listening, methods and styles of reading.

(8L)

Module III:

Other aspects of communication:

Vocabulary:

Single word substitution, Idioms and phrases, Precis writing, Comprehension.

Group Discussions, Extempore, Principles of effective speech and presentations, Role-playing.

(8L)

Module IV:

Introduction to managerial writing:

Business letters: Inquiries, Circulars, Quotations, Orders, Acknowledgement, Claims & adjustments, Collection letters, Sales letters, Drafting of different resumes, Covering letters Applying for a job, Social correspondence, Invitation to speak.

Official Correspondence: Memorandum, Notice, Agenda, Minutes, Circular letters.

(8L)

Module V:

Report writing and Technical Proposals:

Business reports, Types, Characteristics, Importance, Elements of structure, Process of writing, Order of writing, the final draft, checklists for reports.

Technical proposals, Definitions, types and format.

(8L)

Books recommended:

TEXT BOOK

1. "Communication Skills", Sanjay Kumar & PushpLata, Oxford University Press. (T1)
2. "Business Correspondence and Report Writing", R.C.Sharma, Krishna Mohan, McGraw Hill. (T2)
3. "Communication for Business", Shirley Taylor, V. Chandra, Pearson. (T3)

REFERENCE BOOK

1. "Business Communication", HorySankar Mukherjee, Oxford University Press. (R1)
2. "Basic Business Communication", Lesikar I Flatley, McGraw Hill. (R2)
3. "Business Communication Today", Bovee, Thill and Chaterjee, Pearson. (R3)

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Course code: CA406

Course title: Data Structures and Algorithms Lab

Pre-requisite(s): High Level languages like C, C++, Java or Python

Co- requisite(s): Data Structures Lab

Credits:1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester / Level: I/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To assess how the choice of data structures and algorithm design methods impact the performance of programs.
2.	To choose the appropriate data structure and algorithm design method for a specified application.
3.	To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.
4.	Analyse and compare the different algorithms

Course Outcomes

After the completion of this course, students will be able to:

CO1	Choose an appropriate data structure given a computational problem
CO2	Design and analyze the time and space efficiency of various data structures
CO3	Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and quick sort
CO4	Have practical knowledge on the applications of data structures
CO5	Justify the choice of data structure for a given problem

SYLLABUS

1. Program to Find the Number of Elements in an Array
2. Develop and Implement a menu driven program in C for the following Array operations
 - a. Creating Array of N Integer elements.
 - b. Display of Array elements with suitable headings.
 - c. Inserting an element (ELEM) at a given valid position (POS).
 - d. Deleting an element at a given valid position (POS).

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3. Programs for Stack, Queues and Circular Queues using Arrays
 4. Program to convert an Infix Expression into Postfix and Postfix Evaluation
 5. Program to implement stack using arrays
 6. Program to implement stack using linked list
 7. Program to implement multiple stack in a single array
 8. Program to convert infix notation to postfix notation using stacks
 9. Program to implement queue using arrays
 10. Program to implement queue using pointers
 11. Program to reverse elements in a queue
 12. Program to implement circular queue using arrays
 13. Program to create add remove & display element from single linked list
 14. Program to create add remove & display element from double linked list
 15. Program to count number of nodes in linear linked list
 16. Program to create add remove & display element from circular linked list
 17. Programs to implement stack & queues using linked representation
 18. Program to concatenate two linear linked lists
 19. Program to accept a singly linked list of integers & sort the list in ascending order.
 20. Program to reverse linked list
 21. Program to represent polynomial using linked list
 22. Program to add two polynomials using linked list
 23. Program for the creation of binary tree, provide insertion & deletion in c
 24. Program for pre-order, post-order & in-order traversals of a binary tree using non recursive.
 25. Program to count no, of leaves of binary tree
 26. Program for implementation of B-tree (insertion & deletion)
 27. Program for implementation of multi-way tree in c
 28. Program for implementation of AVL tree
 29. Program to implement bubble sort program using arrays
 30. Program to implement merge sort using arrays
 31. Program to implement selection sort program using arrays
 32. Program to implement insertion sort program using arrays
 33. Program to implement topological sort using arrays
 34. Program to implement heap sort using arrays
 35. Program to implement heap sort using pointers
 36. Program to implement bubble sort program using pointers
 37. Program to implement linear search using pointers
 38. Program to implement binary search using pointers
 39. Program to implement linear search using arrays
 40. Program to implement binary search using arrays

Text books:

1. Baluja G S, "Data Structure through C", Ganpat Rai Publication, New Delhi, 2015.
2. Pai G A V, "Data Structures and Algorithms: Concepts, Techniques and Applications",

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2ndEdn, Tata McGraw-Hill, 2008.

- Horowitz E., Sahni S., Susan A., “Fundamentals of Data Structures in C”, 2nd Edition, University Press, 2010.

Reference books:

- Tremblay J. P., Sorenson P. G, “An Introduction to Data Structures with Applications”, 2nd Edn, McGraw-Hill, Inc. New York, NY, USA.
- Lipschutz Seymour, “Data Structures”, 6th Edn, 9th Reprint 2008, Tata McGraw-Hill.
- Drozdek Adam, “Data Structures and Algorithms in C++”, Thomson Learning, New Delhi – 2007.
- Feller J., Fitzgerald B., “Understanding Open Source Software Development”, Pearson Education Ltd. New Delhi

Course code: CA408

Course title: Database Design Concepts Lab

Pre-requisite(s):

Co-requisite(s):

Credits: 1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester/Level: I/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To observe that how the real world data is stored, retrieved, and communicate under the DBMS environment
2.	To design a logical model which having the unique relation between the Data.
3.	To apply the query for the modification of the system.
4.	To develop a conceptual design which allows as to avoid anomalies in superior’s data.
5.	To discuss a system which allows to restrict the uncontrolled exaction and provide rigorous variation of the task.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Describe various data models and schemas used in database management systems.
CO2	Explain the fundamental concepts, data definitions and query processing tasks in relational query languages.
CO3	Recognize database design theory, and evaluate functional dependencies and normal forms in databases.
CO4	Formulate the operations of transaction and concurrent query processing tasks to obtain the correct results even under strict time constraints.
CO5	Interpret the foundational concepts of distributed databases. Illustrate several

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techniques related to transaction management and query processing in distributed database management systems.

SYLLABUS

For the Tables given below:

emp(empno,ename,job,mgr,hiredate,sal,comm,deptno,gr),

dept(deptno,dname,loc)

Write the following queries:

1. List all information about all department from emp table.
2. List all employee names along with their salaries from emp table.
3. List all department numbers, employee numbers and their managers numbers in descending order of deptno from emp table.
4. List department names and locations from the dept table.
5. List the employees belonging to the department 20.
6. List the name and salary of the employees whose salary is more than 1000.
7. List the names of the clerks working in the department 20.
8. List the names of analysts and salesmen.
9. List the details of the employees who have joined before the end of September 81.
10. List the names of employees who are not managers.
11. List the names of employees whose employee number are 7369, 7521, 7839, 7934, 7788.
12. List the employee details not belonging to the department 10, 30, and 40.
13. List the employee name and salary, whose salary is between 1000 and 2000.
14. List the employee names, who are not eligible for commission.(salary having >15,000 eligible for commission)
15. List the employees who are eligible for commission.
16. List the details of employees, whose salary is greater than 2000 and commission is NULL.
17. List the employees whose names start with an "S" (not"s").
18. List the name, salary and PF amount of all the employees(PF is calculated as 10% of salary).
19. List the empno, ename, sal in ascending order of salary.
20. List the employee name, salary, job and Department no descending order of Department No and salary.
21. List the employee details in ascending order of salary.
22. List the employee details in descending order of salary
23. Display name, and sal and commission of all employees whose monthly salary is greater than their commission.
24. Select SMITH HAS WORKED IN THE POSITION OF CLERK IN DEPT 20.Display result in this format.

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25. Generate a statement which prompts the user at runtime. The intention is to display employees hired between 2 given dates.
26. Define a variable representing an expression used to calculate total annual remuneration. Use the variable in a statement which finds all employees who earn \$30000 a year or more.
27. List all the employees name and salaries increased by 15% and expressed as a whole number of dollars.

28. Produce the following

<u>EMPLOYEE AND</u>	<u>JOB</u>
SMITH	CLERK
ALLEN	SALESMAN

29. Produce the following output:

SMITH (Clerk)
ALLEN (Salesman)

30. Do a case sensitive search for a list of employees with a job that the user enters.
31. It has been discovered that the sales people in dept. 30 are not all male. Please produce the following output.

<u>ENAME</u>	<u>DEPTNO</u>	<u>JOB</u>
ALLEN	30	Sales Person

32. Display each employees name and hiredate of dept 20.
33. Display each employees name, hiredate and salary review date. Assume salary review date is one year from hiredate. Output should be in ascending review date.
34. Print list of employees displaying just salary, if more than 1500. If exactly 1500 display " On Target". If less than 1500 display " Below 1500".
35. Write a query which returns DAY of the week (i.e. MONDAY) for any date entered in the format DD/MM/YY.
36. Write a query to calculate length of service of each employee.
37. Find the minimum salary of all employees.
38. Find the maximum, minimum, and average salaries of all employees.
39. List the maximum and minimum salary of each job type.
40. Find how many managers are in each dept.
41. Find the average salary and average total remuneration of each job type. Remember sales man earn commission.

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Ushata *Shamama*

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42. Find out the difference between highest and lowest salary.
43. Find all department s which have more than three employees.
44. Check whether all employee nos are unique. (No Duplicate)
45. List lowest paid employee working for each Manager. Exclude any groups where the minimum salary is less than 1000. Sort the output by salary.
46. Produce a list showing employees 'salary grade'.(> 10000 A, >10000 &<20000 B, >20000 C)
47. Show only employee on Grade C.
48. .Show all employee in Dallas.
49. List the employees name, job, salary, grade and department for everyone in the company except clerks. Sort on salary, displaying the highest first.
50. List the following details of employees who earn \$36000 a year or who are clerks.

Ename	Job	Annual Sal	Dept no	Dname	Grade
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51. Display all employees who earn less than their managers.
52. Display all employees by name and eno along with their managers name and number.
53. Modify above spoliation to display KING who has no MANAGER.
54. Find the job that was files in the first half of 1983 and the name job that was filled in the same period in 1984.
55. Find all employees who have joined before their manager.

<u>EMPLOYEE</u>	<u>HIREDATE</u>	<u>MANAGER</u>	<u>HIREDATE</u>
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56. Find the employees who earn the highest salary in each job, type, sort in descending order of salary.
57. Find the employees who earn the minimum salary for their job, Display the result in descending order of salary
58. Find the most recently hired employees in the department. Order by hiredate.
59. Show the details of any employee who earns a salary greater than the average for their department. Sort in department number order.
60. List all department where there are no employees.

Text book:

1. SQL, PL/SQL the programming Language of Oracle, Ivan Bayross, 4th edition

Course code: CA410

Course title: Object Oriented Design using Java Lab

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Pre-requisite(s):

Co- requisite(s):

Credits:1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester / Level:I/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	Introduce the concepts of object-oriented programming and features of object-oriented programming languages.
2.	To learn advanced features of the JAVA programming language as a continuation of the previous course.
3.	To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods
4.	To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managing complexity.
5.	To enhance problem solving and programming skills in JAVA with extensive programming projects

Course Outcomes

After the completion of this course, students will be able to:

CO1	Explain basic concepts of object-oriented programming.
CO2	Use the characteristics of an object-oriented programming language in a program.
CO3	Use the basic object-oriented design principles in computer problem solving
CO4	Develop their own Applications /Projects using JAVA
CO5	Simulate the problem in the subjects like Operating system, Computer networks and real world problems.

SYLLABUS

List of Programs as Assignments:

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Objective: To Understand and Implement basic OOP features

1. Write a Program to design a class having static member function named showcount() which has the property of displaying the number of objects created of the class.
2. Write a Program which creates & uses array of object of a class.(for eg. implementing the list of Managers of a Company having details such as Name, Age, etc..).

Objective: To Understand and Implement special types of functions like friend function

3. Write a Program to swap private data members of classes named as class_1, class_2 using friend function.
4. Write an inline function to find largest of three number

Objective: To Understand and Implement the concept of constructors

5. Write a Program using copy constructor to copy data of an object to another object.
6. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialize real and imag to two different values.

Objective: To Understand and Implement the concept of Polymorphism

7. Write a program for overloading operator++ and operator—using friend functions
8. Write a program for developing a matrix class which can handle integer matrices of different dimensions. Also overload the operator for addition, multiplication & comparison of matrices.
9. Write a program to compute area of right angle triangle, equilateral triangle, isosceles triangle using function overloading concept.

Objective: To Understand and Implement the concept of Inheritance

10. Write a Program to design a student class representing student roll no. and a test class (derived class of student) representing the scores of the student in various subjects and sports class representing the score in sports. The sports and test class should be inherited by a result class having the functionality to add the scores and display the final result for a student.

11. Write a Program illustrating how the constructors are implemented and the order in which they are called when the classes are inherited. Use three classes named alpha, beta, gamma such that alpha, beta are base class and gamma is derived class inheriting alpha & beta.

Objective: To Understand and Implement exception handling

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12. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

Objective: To Understand and Implement File Operations

13. Write a program to read the class object of student info such as name , age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.

14. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space ,linefeed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.

Books recommended:

Text books:

E. Balagurusamy - Programming in Java, 2nd Edition; Tata McGraw Hill Publication; New Delhi.

Reference books:

Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.

Dietel,Dietel - Java How to program , 7th edition; Pearson Education , New Delhi.

Program Core
Semester II

Course code: MT117

Course title: Basics of Financial Accounting and Management

Pre-requisite(s): NIL

Co- requisite(s): NIL

Credits: 3 L:3 T:0 P:0

Class schedule per week: 3

Semester/Level: II/4

Branch: MCA

Name of Teacher:

Suparnika Das

Ushant Shamama

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Course Objectives

This course enables the students:

1.	To impart knowledge about the scope of financial management and accounting with understanding the concept of financial functions and decision making.
2.	To give knowledge about the various sources of finance
3.	To impart knowledge on capital budgeting decision making with a basic concept of different techniques to appraise business projects
4.	To impart knowledge of working capital management and its policies.
5.	To give knowledge on management of cost and various techniques of cost management.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Apply the concepts of financial management as well as accounting and analyse the statements with the help of Ratio Analysis.
CO2	Identify and implement long and short term sources of finance through capital market and money market.
CO3	Apply diverse appraisal techniques including Non-Discounting and Discounting factors like, Pay Back, ARR, NPV, IRR, Profitability Index etc
CO4	Analyse and implement various techniques of working capital management and its policy implications.
CO5	Explain conceptual framework on management of cost and various techniques of cost management.

SYLLABUS

Module I:

Introduction to Financial Management, Accounting Concept Concept, Finance Functions, Role of Finance Manager, Decision Making. Principles and conventions, Double Entry System, Accounting Statements, Analysis of Financial Statement: Ratio Analysis.

(8L)

Module II:

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Sources of Finance: -Short term & Long term, Stock Market: Primary Market & Secondary Market, Shares: Equity Shares & Preference Shares, Debenture: Definition & Types, Venture Capital, Mutual Fund, Bank Loan: Working Capital Loan & Term Loan.

(8L)

Module III:

Capital Budgeting: -Definition, Concept, Objective, Methods of appraisal; Payback Period, ARR, NPV, IRR, Benefit Cost Ratio.

(8L)

Module IV:

Working Capital Management: -Working Capital: Definition, Gross Working Capital, Net Working Capital, Importance, influencing factors, Working Capital Cycle, Working Capital Policies, Working Capital Financing Policies.

(8L)

Module V:

Cost Management- Cost: Definition, Concept, Classification, Cost Centre: Concept and Types, Cost Sheet. Marginal Costing: Definition, Importance, CVP Analysis: Break Even Analysis, Margin of Safety, Angle of incidence, Graphical Representation, Limitations.

(8L)

Text/Reference Books:-

1. Financial Management by I.M. Pandey. Vikas Publication.
2. An Introduction to Financial Accounting by S.N. Maheshwari, Vikas Publication.
3. Cost & Management Accounting by M.N. Arora, Vikas Publication
4. Financial Management: Theory & Practices by Chandra Prasanna, TMH Publication

Course code: CA413

Course title: DATA COMMUNICATION AND COMPUTER NETWORK

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

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Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To build an understanding of the fundamental concepts of the data communication model and communications architecture.
2.	To study characteristics of communication mediums and the characteristics of signals propagated through different transmission media, including concepts of transmission impairments.
3.	To understand the basic principles of signal encoding techniques, error-detection, and error-correction techniques.
4.	To understand techniques for flow control and multiplexing for maximum utilization of bandwidths in the data communications process.
5.	To understand the various switching techniques and routing techniques for efficient transmission.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand and be able to explain the principles of a layered protocol architecture; be able to identify and describe the system functions in the correct protocol layer and further describe how the layers interact.
CO2	Understand, explain and calculate digital transmission over different types of communication media.
CO3	Understand, explain and solve mathematical problems for data-link and network protocols.
CO4	Describe the principles of access control to shared media and perform performance calculations.
CO5	Understand and explain the principles and protocols for route calculations and be able to perform such calculations.

SYLLABUS

MODULE - I

Data Communications and Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture.

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MODULE - II

Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.

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Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

(8L)

MODULE - III

Signal Encoding Techniques: Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

(8L)

MODULE – IV

Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC).

Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

Circuit Switching and Packet Switching: Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Softswitch Architecture, Packet-Switching Principles, X.25, Frame Relay.

(8L)

MODULE -V

Asynchronous Transfer Model: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.

Routing in Switched Networks: Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms.

(8L)

Text Book:

1. Stallings W. "Data and Computer Communications", 7th Edition., Pearson Education./ PHI, New Delhi, 2006.

Reference Books:

1. Forouzan B. A., "Data Communications and Networking", 4th Edition. TMH, New Delhi, 2006.
2. Gupta P.C. "Data Communications and Computer Networks", PHI, New Delhi 2006.

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Course code: CA415

Course title: SOFTWARE ENGINEERING PRINCIPLES

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	Students are effective team members, aware of cultural diversity, who conduct themselves ethically and professionally
2.	Students use effective communication skills and technical skills to assure production of quality software, on time and within budget.
3.	Students build upon and adapt knowledge of science, mathematics, and engineering to take on more expansive tasks.
4.	Able to increase level of self-reliance, technical expertise, and leadership.

Course Outcomes

After the completion of this course, students will be:

CO1	Explain the software engineering principles and techniques
CO2	Apply Software Project Management Practices
CO3	Apply the knowledge gained for their project work as well as to develop software following software engineering standards
CO4	Analyze various methods of software testing strategies
CO5	Develop self-reliance, technical expertise, and leadership.

SYLLABUS

MODULE: I

Introduction to Software Engineering: Evolving Role of Software, Changing Nature of Software, Legacy Software, Process Frame work, Process Patterns, Process Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Unified Process Model, Agile Process Model.

(8L)

MODULE: II

Requirement Engineering: A bridge to design and construction, Requirement Engineering Task, Initiating the Requirement Engineering Process, Eliciting Requirements, Developing Use case, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

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MODULE: III

Design Engineering: Design Process and Design Quality, Design Concepts, Design Models, Pattern Based Software Design.

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MODULE: IV

Testing Strategies and Testing Tactics: Strategic Approach to software Testing, Test Strategies for conventional and Object Oriented Software, Validation Testing System Testing, White Box Testing, Basic Path Testing Control Structure Testing, Black Box Testing, Object Oriented Testing Methods.

(8L)

MODULE: V

Metric for process and Estimation Techniques: Process metrics, Software Measurement, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation for Object Oriented Projects Specialized Estimation Techniques.

Software Quality and Configuration Management: Quality Concepts, Software Quality Assurance, Software Reliability, Software Configuration Management, SCM Repository, SCM Process.

(8L)

Text Book:

1. Pressman Roger S., "Software Engineering – A Practitioner's Approach", 6th Edition., Tata McGraw Hill.

Reference Books:

1. Vliet Haus Van, "Software Engineering – Principles and Practice", Wiley John and Sons, 2nd Edition.
2. Sommerville Ian, "Software Engineering", 7th Edition., Pearson Education.

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Course code: CA417

Course title: THEORY OF COMPUTATION

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	Define a system and recognize the behavior of a system.
2.	Design finite state machines and the equivalent regular expressions.
3.	Construct pushdown automata and the equivalent context free grammars
4.	Design Turing machines and Post machines
5.	Learn about the issues in finite representations for languages and machines, as well as gain a more formal understanding of algorithms and procedures.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Relate formal languages and mathematical models of computation
CO2	Attain knowledge about different types of languages and the corresponding machines
CO3	Learn about the pushdown machine and its role in compiler construction
CO4	Understand the capability of real computers and learn examples of unsolvable problems.
CO5	Analyse classes of P, NP, NP-C and NP-Hard problems

SYLLABUS

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MODULE: I

Basic Mathematical Objects and Mathematical Induction: Sets, logic, Functions, Relations, Alphabets, Strings, Languages, Principle of mathematical induction, Recursive definition.

(8L)

MODULE: II

Regular Expressions and Finite Automata: Regular languages and Regular Expressions, Memory required to recognize a language, Finite Automata, capability & limitations of FSM, Deterministic Finite Automata, Non-Deterministic Finite Automata, NFA with ϵ -moves, regular sets & regular expressions, Equivalence of DFA and NFA, NFA from regular expressions, regular expressions from DFA, Moore versus Mealy m/c, two way finite automata equivalence with one way, Kleen's Theorem, applications of finite automata.

(8L)

MODULE: III

Regular and Non-regular languages: Criterion for Regularity, Minimal Finite Automata, Pumping Lemma for Regular Languages, Decision problems, Regular Languages and Computers.

Context Free Grammars: Introduction, definition, Regular Grammar, Derivation trees, Ambiguity, Simplified forms and Normal Forms, Applications.

(8L)

MODULE: IV

Pushdown Automata: Definition, Moves, Instantaneous Descriptions, Language recognised by PDA, Deterministic PDA, Acceptance by final state & empty stack, Equivalence of PDA, Pumping lemma for CFL, Interaction and Complements of CFL, Decision algorithms.

Turing Machines: Definition and examples, Computing Partial Functions with Turing Machine(TM), Combining TMs, Variations of TMs, Multi-tape TMs, Non-deterministic TM, Universal TM, Church Thesis.

(8L)

MODULE: V

Recursively Enumerable Languages: Recursively Enumerable and Recursive, Enumerating Language, Context Sensitive and Chomsky Hierarchy.

Unsolvable Problems and Computable Functions: Nonrecursive Language and unsolvable Problems, Halting Problem, Rice Theorem, Post Correspondence Problem.

Computational Complexity: Discussion on P, NP, NPC and NP-Hard Problems.

(8L)

Text Books:

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1. Martin John “Introduction to Languages and the Theory of Computation”, 3rd Edition, TMH.

Reference Books:

1. Mishra K.L.P & Chandrasekharan N., “Theory of Computer Science”, PHI.
2. Hopcroft John E. And Ullman Jeffrey D., “Introduction to Automata Theory, Languages & Computation”, 3rd Edition, Narosa, 2008.
3. Lewis H. R. and Papadimitrou C. H, “Elements of the theory of Computation”, PHI.

Course code: CA419

Course title: ANALYSIS OF ALGORITHMS

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	Understand different notions of asymptotic complexity
2.	Find the time and space complexity of an algorithm
3.	Understand various algorithm design techniques like greedy, divide and conquer, and dynamic programming.
4.	Understand NP completeness.
5.	Implement, analyze, and compare algorithms.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Determine the asymptotic complexity of an algorithm including the solving of recurrence relations
CO2	Explain various algorithm design techniques like divide and conquer, greedy, dynamic programming, backtracking, and branch & bound.
CO3	Apply various algorithm design techniques to solve algorithmic problems.
CO4	Compare various algorithms of a given problem.

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CO5	Design efficient algorithm of a given problem using deterministic or non-deterministic approach.
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SYLLABUS

MODULE: I

Elementary Algorithmic: Introduction, Problems and instances, The efficiency of algorithms, Average and worst-case analyses, What is an elementary operation, why look for efficiency.

Asymptotic Notation: Introduction, A notation for “the order of”, Other asymptotic notation, Conditional asymptotic notation, Conditional asymptotic notation, Asymptotic notation with several parameters, Operations on asymptotic notation.

Analysis of Algorithm: Introduction, Analyzing control structures, Using a barometer, Supplementary examples, Average-case analysis, Amortized analysis, Solving recurrences.

(8L)

MODULE: II

Greedy Algorithms: General characteristics of greedy algorithms; The knapsack problem; Minimum spanning trees: Prim, Kruskal algorithms, implementation issues and complexity analysis; Shortest path problem; scheduling.

(8L)

MODULE: III

Divide-and-conquer: Introduction; Large integer multiplication; Binary search; Merge Sort, Quick Sort; Finding the median and selection problem; Matrix Multiplication; Exponentiation.

(8L)

MODULE: IV

Dynamic Programming: Introduction and basic concepts; Calculation the binomial coefficient; The World Series; Making change; 0-1 knapsack problem; All Pair Shortest paths and Transitive Closure; Chained matrix multiplication; Travelling Salesman Problem.

(8L)

MODULE: V

Exploring Graphs: Traversing trees, Depth-first search, Breadth-first search; Backtracking; Branch-and-bound.

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An Introduction to NP Completeness: Introduction, Concept of P and NP; Polynomial Reduction; NP Completeness Proof of some problems.

(8L)

Text Book:

1. Brassard G. & Bratley P., “Fundamentals of Algorithms”, New Delhi, 2005.

Reference Books:

1. E.Horowitz. et.al., “Fundamentals of Computer Algorithms”, Galgotia Publication Pvt. Ltd.,New Delhi, 2004.
2. Cormen T.H., Leiserson Charles E.,Rivest Ronald, Stein Clifford “Introduction to Algorithms” 3rd Edition, PHI, New Delhi, 2005.
3. Dasgupta S., Papadimitriou C.H., Vaziran U.V, “ Algorithm” 3rd Edition , TMH, New Delhi, 2007.

Course code: CA414

Course title: DCCN LAB

Pre-requisite(s):

Co- requisite(s):

Credits:1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	To familiarize the student in introducing and exploring various Network topologies and networking protocols
2.	To understand the use of client/server architecture in application
3.	To enable the student on how to approach for networking problems using networking simulation tools.
4.	To Design reliable servers using both TCP and UDP sockets

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5.	Familiar with network tools and network programming.
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Course Outcomes

After the completion of this course, students will be able to:

CO1	Express programming & simulation for networking problems.
CO2	Get a thorough understanding of various aspects of networking devices
CO3	Design and implement simulation of a simple LAN and a WAN that meet a specific set of criteria
CO4	Identify the elements of a communication network
CO5	Simulate various OSI layer protocols using C/C++/ Java

SYLLABUS

List of Programs as Assignments:

1. Lab Assignment No: 1

Q1. To familiarize with the Lab Network Topology, Locating different interfaces, routers and switches. Studying different pools of IP addresses.

Q2. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.







Q3. To learn and observe the usage of different networking commands e.g.PING, TRACEROUTE. Learning remote login using telnet session. Measuring typical average delays between different locations of the network.

2. Lab Assignment No: 2

Q1. What is the IP of the machine you are using? Compare it with the IP of your neighbors. Are the IPs of your neighbors same? Why or Why not?

Q2. Ping” is a tool used to determine if a server is responding and to estimate the round trip time of a message sent to that server. Use the ping command for the following URLs and record the success or failure statistics along with the average round trip time.

- a) google.com
- b) facebook.com
- c) bitmesra.ac.in

Q3. Trace the route that is taken when you try to access:

- a) google.com
- b) facebook.com
- c) bitmesra.ac.in

Q4. Network Commands on Linux / Unix

3. **Lab Assignment No: 3**

Q1. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC 32.

Q2. Implementation of Sub-netting and Super-netting.

Q3. To study different types of transmission media, various topologies, and configure modem of computer HUB and Switches.

4. **Lab Assignment No: 4**

Q1. Write a C/C++ program to determine if the IP address is in Class A, B, C, D, or E.

Q2. Write a C/C++ program to determine if the IP address is in Class A, B, or C.

Q3. Write a C/C++ program to translate dotted decimal IP address into 32 bit address.

Q4. To implement a routing protocol and check its connectivity in a variable length subnet masked network

Q5. Write a C/C++ program to perform bit stuffing and de-stuffing.

5. **Lab Assignment No: 5**

Q1. Implement Dijkstra's algorithm to compute the Shortest path through a graph.

Q2. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm

Q3. Take an example subnet of hosts. Obtain broadcast tree for it.

6. **Lab Assignment No: 6**

Q1. Build implementations of the Internet protocols

Q2. Implementation of Stop and Wait Protocol and Sliding Window Protocol.

Q3. Write a code simulating ARP /RARP protocols.

7. **Lab Assignment No: 7**

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- Q1. Create a socket for HTTP for web page upload and download
Q2. Write a code simulating PING and TRACEROUTE commands.

8. Lab Assignment No: 8

- Q1. Study and implement model for Socket Programming and Client – Server model.
Q2. Experiments with NS2(or any other simulator) to study behavior (especially performance of) link layer protocols such as Ethernet and 802.11 wireless LAN..

9. Lab Assignment No: 9

- Q1. Experimental study of application protocols such as HTTP, FTP,SMTP, using network packet sniffers and analyzers such as **Wireshark**. Small exercises in socket programming in C/C++/Java..

10. Lab Assignment No: 10

- Q1. Take a 64 bit playing text and encrypt the same using DES algorithm.
Q2. Write a program to break the above DES coding
Q3. Using RSA algorithm encrypts a text data and Decrypt the sameobjective: To Understand and Implement Data Interpolation

11. Lab Assignment No: 11

- Q1. Applications using TCP and UDP Sockets like d. DNS e. SNMP f. File Transfer
Q2. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
Q3. Echo client and echo server b. Chat c. File Transfer

Books recommended:

TEXT BOOKS

1. William Stallings, Data and Computer Communication, Prentice Hall of India.
2. Behrouz A. Forouzan, Data Communication and Networking, McGraw-Hill.
3. Andrew S. Tanenbaum, Computer Networks, Prentice Hall.

REFERENCE BOOKS

1. W. Richard Stevens, TCP/IP Illustrated, Volume 1, Addison-Wesley
2. Douglas Comer, Internetworking with TCP/IP, Volume 1, Prentice Hall of India.

Course code: CA416

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Course title: SOFTWARE ENGINEERING LAB

Pre-requisite(s):

Co- requisite(s):

Credits:1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To understand the concept of UML
2.	To gain knowledge of various diagrams.
3.	Learn about software requirement specification.
4.	To gain knowledge about software design specification.
5.	To learn about the relationships among different UML diagrams.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify the software requirement capturing process.
CO2	Elaborate knowledge about dynamic view of system.
CO3	Analyze about static view of software system.
CO4	Analysis the relationship among static and dynamic view of system.
CO5	Identify the process of deployment of software system.

SYLLABUS

List of Programs as Assignments:

1. Lab Assignment No: 1

Objective: To Understand and Implement Identification of Requirements from Problem Statements

- Q1. To consider the problem statement for a project to be developed and list out the ambiguities, inconsistencies and incompleteness of the problem statement.
- Q2. To identify different functionalities to be obtained from a system and characteristics that a system should have, but not possessed by the system itself

2. Lab Assignment No: 2

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Objective: To Understand and Implement Estimation of Project Metrics

- Q1. To estimate the minimum size of the team one would require to develop a project through application of intermediate COCOMO.
- Q2. To use Halstead's metrics to estimate the effort required to recreate a program in JAVA from C.

3. Lab Assignment No: 3

Objective: To Understand and Implement Modeling UML Use Case Diagrams and Capturing Use Case Scenarios

- Q1. To draw a use case diagram for the given case study.
- Q2. To identify the primary and secondary actors for the system and generalization of use cases and «include» stereotypes to prevent redundancy in the coding phase.

4. Lab Assignment No: 4

Objective: To Understand and Implement E-R Modeling from the Problem Statements

- Q1. To identify the possible entity sets, their attributes, and relationships for the given case study.
- Q2. To draw an ER diagram for the given case study.

5. Lab Assignment No: 5

Objective: To Understand and Implement Identification of Domain Classes from the Problem Statements

- Q1. To identify potential classes and their attributes for the given case study.
- Q2. To utilize expert knowledge on the subject matter to identify other relevant classes.

6. Lab Assignment No: 6

Objective: To Understand and Implement Identification of Components from the Problem Statements

- Q1. To identify potential components for the given case study.
- Q2. To draw component diagram for the given case study

7. Lab Assignment No: 7

Objective: To Understand and Implement State Chart and Activity Modeling

- Q1. To draw a statechart diagram to graphically represent the given case study.
- Q2. To draw an activity diagram to graphically represent the workflow of the given case study.

8. Lab Assignment No: 8

Objective: To Understand and Implement Modeling UML Class Diagrams and Sequence diagrams

- Q1. To draw class diagram for the given case study.
- Q2. To draw sequence diagram for the given case study.

9. Lab Assignment No: 9

Objective: To Understand and Implement Modeling Data Flow Diagrams

- Q1. To draw data flow diagram (Level 0, 1 and 2) for the given case study.

10. Lab Assignment No: 10

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Objective: To Understand and Implement Estimation of Test Coverage Metrics and Structural Complexity

- Q1. To identify the basic blocks for a given program
- Q2. To draw a CFG using the basic blocks
- Q3. To determine McCabe's complexity from a CFG.

11. Lab Assignment No: 11

Objective: To Understand and Implement Designing Test Suites

- Q1. To design a test suite for the given case study.
- Q2. To verify implementation of functional requirements by writing test cases.
- Q3. To analyze results of testing to ascertain the current state of the project.

12. Lab Assignment No: 12

Objective: To Understand and Implement Forward and Reverse Engineering

- Q1. To obtain programs from UML diagrams.
- Q2. To obtain UML diagrams from programs.

Books recommended:

TEXT BOOKS

- 1. Software Engineering, Ian Sommerville, Pearson, 10th Edition, 2016.(T1)
- 2. Software Engineering: A Practitioner's Approach, Roger S. Pressman, McGraw Hills, 7th Edition, 2009.(T2)

REFERENCE BOOKS

- 1. Fundamentals of Software Engineering, Rajib Mall, Prentice-Hall of India, 3rd Edition, 2009.(R1)

Course code: CA422

Course title: IT Tools & Techniques Lab

Pre-requisite(s):

Co- requisite(s):

Suparnakanti Das

Ushata Shamana

Praveen SDV
Smruti

Credits:1.5 L: 0 T: 0 P:3

Class schedule per week: 3

Class: MCA

Semester / Level: IV/5

Branch: MCA

Course Objectives

This course enables the students

1.	To impart the basic concepts of User Interface Design.
2.	To develop understanding about human computer interaction methods that utilize more general, widespread and easier-to-learn capabilities.
3.	The cognitive and perceptual constraints that affect interface design
4.	Techniques for evaluating the usability of an interface
5	How to communicate the results of a design process, both in oral and written form

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify the key terms related to user interfaces and user interface design and implementation
CO2	Identify and describe various types of computer users and computer use contexts
CO3	Identify and describe various types of user interfaces
CO4	Explain the user interface design process
CO5	Identify and describe common abstract user interface components, such as radio buttons and group boxes

SYLLABUS

List of Programs as Assignments:

1. Lab Assignment No: 1

Objective: To Understand and Implement HTML

Q1. To create a simple html file to demonstrate the use of different tags.

Q2. To create an html file to link to different html page which contains images, tables, and also link within a page.

Q3. To create an html page with different types of frames such as floating frame, navigation frame & mixed frame.

Q4. To create a registration form as mentioned below.

Create an html page named as "registration.html"

a) set background colors

b) use table for alignment

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c) provide font colors & size

2. Lab Assignment No: 2

Objective: To Understand and Implement CSS

Q1. To create an html file by applying the different styles using inline, external & internal style sheets.

1. Create an external style sheet named as “external_css.css” and provide some styles for h2, hr, p & a tags.

2. Create an html file named as “Style_sheet.html”

a) Include the external style sheet with necessary tag.

b) Include the internal style sheet for body tags & also use class name, so that the style can be applied for all tags.

c) Include a tags with inline style sheet.

3. Lab Assignment No: 3

Objective: To Understand and Implement JavaScript

Q1. To write a Javascript program to define a user defined function for sorting the values in an array.

Q2. Create an html page named as “exception.html” and do the following.

1. within the script tag write code to handle exception

a) define a method RunTest() to get any string values(str) from the user and call the method Areletters(str).

b) In Areletters(str) method check whether str contain only alphabets (a-z, AZ), if not throw exception.

c) Define an exception method Input Exception(str) to handle the exception thrown by the above method.

2. Within the body tag define a script tag to call RunTest() method defined.

Q3. To display the calendar using javascript code by getting the year from the user.

Q4. To create an html page to display a new image & text when the mouse comes over the existing content in the page.

4. Lab Assignment No: 4

Objective: To Understand and Implement ASP

Q1. To create an ASP file to find the no of hits on the page and to have rotating banner content.

Q2. To create a table of content using ASP program & navigate within the pages.

Q3. Create an ASP file named as request.asp

a) Create a simple form to get the first name & last name and a button submit. When the button is clicked the values in the text box are printed by response object by

Request.QueryString

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b) Create a hyperlink with some values defined in the tag & display the same using request & response object.

Q4.To display all the content in the database using ASP program.

5. Lab Assignment No: 5

Objective: To Understand and Implement Java Servlets

Q1. To create a simple servlet program to display the date (using Tomcat server).

Q2. To create a servlet program to retrieve the values entered in the html file (Using NetBeans IDE).

Q3. To display the cookie values that are entered in the html page using servlet program. (usingNetBean IDE).

6. Lab Assignment No: 6

Objective: To Understand and Implement XML

Q1. To create a simple catalog using XML file

Q2. To create external style sheet and using the style sheet in xml file.

7. Lab Assignment No: 7

Objective: To Understand and Implement PHP

Q1. To create a php program to demonstrate the different file handling methods.

Q2. To create a php program to demonstrate the different predefined function in array, Math, Data & Regular Expression.

Books recommended:

TEXT BOOKS

1. Web Technologies: A Computer Science Perspective , Jeffrey C Jackson , Pearson Education , India.
2. Stephen Wynkoop, Running a perfect website, QUE, 1999

REFERENCE BOOKS

1. Eric Ladd, Jim O' Donnel, Using HTML 4, XML and Java, Prentice Hall of India- QUE, 1999
2. Chris Bates, Web Programming - Building Intranet applications, Wiley Publications, 2004
3. Deitel, Deitel& Nieto, Internet and World Wide Web - How to Program, Pearson Education Asia, 2000

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Program Core
Semester III

Course code: CA511

Course title: BASICS OF MACHINE LEARNING

Pre-requisite(s):

Co- requisite(s): None

Credits:3 L: 3 T: 0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	To formulate machine learning problems corresponding to different applications.
2.	To understand various supervised, semi-supervised and unsupervised machine learning algorithms.
3.	To familiarize various machine learning software libraries and data sets publicly available.
4.	To develop machine learning based system for various real-world problems.
5.	To assess how the choice of a machine learning algorithm impacts the accuracy of a system.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Formulate machine learning problems corresponding to different applications: data, model selection, model complexity
CO2	Demonstrate understanding of a range of machine learning algorithms along with their strengths and weaknesses
CO3	Implement machine learning solutions to classification, regression, and clustering problems
CO4	Design and implement various machine learning algorithms in a range of real-world applications
CO5	Evaluate and analyse the performance of a machine learning algorithm or a system based on machine learning algorithm.

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SYLLABUS

Module I

Introduction to Machine Learning

Machine Learning – what and why? Supervised learning and unsupervised learning. Basics of Linear Algebra - matrices and vectors, Eigen value decomposition, principal component analysis. (8L)

Module II

Supervised Learning

Linear Regression with one variable, cost function, gradient descent for linear regression. Linear regression with multiple variables, normal equation, gradient descent. Logistic regression, cost function, gradient descent. Regularization - the problem of overfitting, regularization in linear regression and logistic regression. (8L)

Module III

Dimensionality reduction- Principal components. Decision Tree, Overfitting and Pruning, Support Vector Machine and Kernel; Noise, bias-variance trade-off, under-fitting and over-fitting concepts. (8L)

Module IV

Neural Networks representations, forward propagation, multi class classification. neural networks cost function, backpropagation algorithm. Regularization and bias/ variance. Recurrent networks. (8L)

Module V

Unsupervised and Semi Supervised Learning

Clustering - K-means partitional clustering, choosing the number of clusters. Hierarchical Agglomerative Clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learning with EM using labeled and unlabeled data. Brief introduction to ML applications in computer vision, speech and natural language processing, etc. (8L)

Text Books:

1. Mitchell Tom, “Machine Learning”, Latest Edition, Mc-Graw Hill.

Reference Books:

1. Shwartz Shai Shalev, and David Shai Ben, “Understanding Machine Learning”, Cambridge University Press, 2017.
2. Bishop Christopher “Pattern Recognition and Machine Learning”, Springer, 2006.
3. A Course in Machine Learning by Hal Daumé III (freely available online)

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Course code: CA513
Course title: COMPILER DESIGN
Pre-requisite(s): Automata theory
Co- requisite(s):
Credits: 4 L:3 T:1 P: 0
Class schedule per week: 04
Class: MCA
Semester / Level:III/5
Branch: MCA

Course Objectives

This course enables the students to:

1.	Understand the need of compiler
2.	Provide a thorough understanding of design, working, and implementation of programming languages
3.	Trace the major concept areas of language translation and compiler design
4.	Create an awareness of the function and complexity of modern compilers.
5.	Develop knowledge for developing tool for natural language processing

Course Outcomes

After the completion of this course, students will be able to

CO1	Understand the need of compiler for <i>interfacing</i> between users and machine
CO2	Perceive the role of several phases of compilation process
CO3	Trace the major concept areas of language translation and compiler design
CO4	Develop a comprehensive Compiler for a given language
CO5	Apply knowledge for developing tool for natural language processing

SYLLABUS

MODULE -I

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Introduction to Compiling: Translators, Interpreters, Compiler, other language processors, Phases of a compiler, Passes of compiler, Back-end and Front-end of compiler, Basic idea on Symbol Table, Issues in Compiler construction, Concept on *l*-value and *r*-value, Programming Language basics, Compiler construction tools.

Lexical and Syntax Analysis: *Lexical analysis:* Role of a Lexical analyser, Input buffering, Specification and recognition of tokens, State-machine driven lexical analysers and their implementations, Lexical analyser generator tool: LEX/FLEX.

(8L)

MODULE -II

Syntax analysis: Need and Role of Parser, Importance of Context Free Grammars in designing Parser, Parse trees, derivations and sentential forms, Ambiguity.

Top down parsing: Backtracking, Recursive descent and Predictive parsers (LL), Error-detection in LL parser

Bottom-up parsing: Simple Shift-Reduce parsing, LR Parsers: SLR, CLR and LALR parsers, Error detection in S-R parsing, Handling ambiguous grammar, Parser generator tool: YACC/BISON

(8L)

MODULE -III

Syntax Directed Translation: Syntax directed definitions, Construction of syntax tree, Attribute grammars, Inherited and synthesized attributes, Dependency graphs, Evaluation orders of attributes, S-Attributed definitions, L-attributed definitions.

Intermediate code generation: Variants of Syntax Trees, Three-address codes of different constructs, Translation of expressions, Type checking: Rules for type checking, Type conversion;

(8L)

MODULE -IV

Machine independent code optimization: Sources of optimization, DAG, Peephole optimization and Basic Blocks, Loops in Flow Graphs, Data flow analysis and equations

(8L)

MODULE -V

Runtime Environment and Code Generation:

Runtime environment: Storage organization: Static and Dynamic, Stack allocation and Heap allocation of memory;

Code generation: Issues in designing of a code generator, Register allocation and Assignment, Target machine (assembly code for 80- series)

(8L)

Text Book:

1. Aho A.V., Sheth R. I. and Ullman J.D. "Compilers Principles Techniques and Tools", Pearson Education.

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Reference Books:

1. Levine John R., Mason Tony, Brown Doug “Lex & Yacc”, O’reilly.
2. Appel Andrew N., “Modern Compiler Implementation in C”, Cambridge University Press.
3. Cooper & Linda “Engineering a Compiler”, Elsevier theory.

Course code: CA515

Course title: SOFT COMPUTING

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

Branch: MCA

Course Objective:

This course enables the students:

1.	To know the basic functions of different AI branches.
2.	To understand the functionalities of neural networks .
3.	To know the application of fuzzy logic.
4.	To understand the basic functionalities of optimizations through soft computing.
5.	To find the basic functions of soft computing.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Solve numerical on Fuzzy sets and Fuzzy Reasoning.
CO2	Develop Fuzzy Inference System (FIS).
CO3	Solve problems on Genetic Algorithms
CO4	Explain concepts of neural networks
CO5	Develop neural networks models for various applications.

SYLLABUS

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MODULE – I

Introduction to Artificial Intelligence System, Neural Network, Fuzzy Logic & Genetic Algorithm. Fuzzy Set Theory: Fuzzy Versus Crisp, Crisp Set, Fuzzy Set, Crisp Relation, Fuzzy Relations. (8L)

MODULE – II

Fuzzy System: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based System, Defuzzification Methods, and Applications. (8L)

MODULE – III

Genetic Algorithms, Basic Concepts, Creation Of Offspring, Working Principle, Encoding, Fitness Function, Reproduction.

Genetic Modeling, Inheritance Operations, Cross Over, Inversion And Deletion, Mutation Operator, Bit Wise Operators, Generation Cycle, Convergence Of Genetic Algorithm, Application, Multi-Level Optimization, Real Life Problems, Difference And Similarities Between GA And Other Traditional Methods, Advanced In GA. (8L)

MODULE – IV

Fundamentals Of Neural Networks, Basic Concepts Of Neural Network, Human Brain, Model Of An Artificial Neuron, Neural Network Architectures, Characteristic Of Neural Networks, Learning Method, Taxonomy Of Neural Network Architectures, History Of Neural Network Research, Early Neural Network Architectures, Some Application Domains. (8L)

MODULE – V

Back Propagation Network Architecture Of Back Propagation Network, Back Propagation Learning, Illustration, Applications, Effect Of Tuning Parameters Of The Back Propagation Neural Network, Selection Of Various Parameters In BPN, Variations Of Standard Back Propagation Algorithm.

Associative Memory And Adaptive Resonance Theory, Autocorrelations, Hetrocorrelators , Multiple Training Encoding Strategy, Exponential BAM, Associative Memory For Real Coded Pattern Pairs, Applications, Introduction To Adaptive Resonance Theory, ARTI, Character Recognition Using ART1 (8L)

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Text Book:

1. Rajasekharan S. &Vijayalakshmi G. A. “Neural Network Fuzzy Logic and GeneticAlgorithm Synthesis and Applications”, Prentice Hall of India PLT, Pai, 2004.

Reference Book:

1. Jang JyhShing R, Sun C. T., Mizutani E. “Neuro Fuzzy and Soft Computing –A Computational Approach to Learning and Machine Intelligence”, Prentice Hall of India, 1997.

Course code: CA512

Course title: Basics of Machine Learning Lab

Pre-requisite(s):

Co- requisite(s): None

Credits: 1.5 L: 0 T: 0 P: 3

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

Branch: MCA

Name of Teacher:

Course Objectives

This course enables the students:

1.	To formulate machine learning problems corresponding to different applications.
2.	To understand various supervised, semi-supervised and unsupervised machine learning algorithms.
3.	To familiarize various machine learning software libraries and data sets publicly available.
4.	To develop machine learning based system for various real-world problems.
5.	To assess how the choice of a machine learning algorithm impacts the accuracy of a system.

Course Outcomes

After the completion of this course, students will be able to:

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CO1	Formulate machine learning problems corresponding to different applications: data, model selection, model complexity
CO2	Demonstrate understanding of a range of machine learning algorithms along with their strengths and weaknesses
CO3	Implement machine learning solutions to classification, regression, and clustering problems
CO4	Design and implement various machine learning models
CO5	Execute and analyse machine learning algorithms

Syllabus:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs

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Text Books:

2. Mitchell Tom, "Machine Learning", Latest Edition, Mc-Graw Hill.

Reference Books:

3. Shwartz Shai Shalev, and David Shai Ben, "Understanding Machine Learning", Cambridge University Press, 2017.
4. Bishop Christopher "Pattern Recognition and Machine Learning", Springer, 2006.

Course code: CA514

Course title: COMPILER DESIGN LAB

Pre-requisite(s):

Co- requisite(s): None

Credits: 1.5 L: 0 T: 0 P: 3

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

Branch: MCA

Name of Teacher:

Course Objectives

This course enables the students to:

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1.	Understand the need of compiler
2.	Provide a thorough understanding of design, working, and implementation of programming languages
3.	Trace the major concept areas of language translation and compiler design
4.	Create an awareness of the function and complexity of modern compilers.
5.	Develop knowledge for developing tool for natural language processing

Course Outcomes

After the completion of this course, students will be able to:

CO1	Apply different compiler writing tools to implement the different Phases.
CO2	Analyze the data flow and control flow.
CO3	Construct the intermediate representation.
CO4	Design and develop various modules of a compiler.
CO5	Develop modules of compiler using Lex and Yacc tools.

SYLLABUS

List of Programs as Assignments:

1. Lab Assignment No: 1

Objective: To Understand the concept of tokens.

Q1. C program to count white spaces, numbers, words in a file./

2. Lab Assignment No: 2

Objective: To Understand the process of identification of tokens.

Q1. C program to design Finite automata to identify different tokens(identifiers, constants, operators, etc.).

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3. Lab Assignment No: 3

Objective: To have a brief Understanding to lex programming.

Q1. Count number of a's in given string.

Q2. Identify different patterns like aa, ab, not containing a, etc. in given string .

4. Lab Assignment No: 4

Objective: To Understand lex programming tool.

Q1. Lex program to Identify all tokens of C programs.

5. Lab Assignment No: 5

Objective: To Understand and Implement structure of any programming language.

Q1. Design and Code individual programming code with all possible tokens in programming language.

6. Lab Assignment No: 6

Objective: To Understand lex programming tool in depth.

Q1. Starting and ending with 'a'.

Q2. # a's divisible by 2 or b's divisible by 3.

Q3. 4th Symbol 'a' from RHS.

Q4. Output code after removing white spaces and comment.

7. Lab Assignment No: 7

Objective: To Understand and Implement Parser using yacc.

Q1. Build parsers using yacc for $L(G) = \{ \square^i \square^j \mid i \geq j \}$ over $\{a,b\}$

8. Lab Assignment No: 8

Objective: To Understand and Implement parser for different grammars.

Q1. Build Parser using yacc for $L(G)$ where rule set of G is $\{ S \rightarrow aSb, S \rightarrow bSa, S \rightarrow c \}$ over $\{a,b,c\}$.

9. Lab Assignment No: 9

Objective: To Understand and Implement parser coding.

Q1. Build parser using yacc to convert the infix expression to postfix expression.

10. Lab Assignment No: 10

Objective: To Understand and Implement parser coding.

Q1. Build a calculator in yacc which takes expression in postfix notation.

Q2. Build parsers using yacc to convert the prefix expression into the postfix expression.

11. Lab Assignment No: 11

Objective: To Understand and Implement parser for validation and operations.

Q1. Build parsers using yacc to validate the C statements. E.g `int a,b,c;(valid)`

Q2. Build calculator in yacc.

Books recommended:

TEXT BOOKS

1. lex & yacc (2nd ed.) : O'Reilly & Associates, Inc. Sebastopol, CA, USA ©1992 .

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REFERENCE BOOKS

1. Lex & Yacc : O'Reilly & Associates, Inc. Sebastopol, CA, USA ©1992. **(R1)**

**Program Electives I
Semester II**

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Course code: CA431

Course title: Distributed Databases Concepts

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students:

1.	To understand the structure of databases distributed over the network.
2.	To learn Query processing and decomposition.
3.	To understand how to create a distributed database using fragmentation.
4.	To learn transaction processing in a distributed environment.
5.	To understand how concurrency control is performed in a distributed environment.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Explain detailed architecture of distributed database.
CO2	Design a distributed database for any environment using horizontal and vertical fragmentation.
CO3	Describe transaction execution, rules and protocols used in concurrent access in a distributed environment.
CO4	Perform Query Processing and its decomposition a distributed database.
CO5	Design a reliable database.

SYLLABUS

Module I:

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Introduction: Distributed Data Processing, What is a Distributed Database System? Promises of DDBSs, Problem Areas.

(8L)

Module II:

Distributed DBMS Architecture: DBMS Standardization, Architectural Models for Distributed DBMSs, Distributed DBMS Architecture.

Distributed Database Design: Alternative Design Strategies, Distribution Design Issues, Fragmentation, Allocation.

(8L)

Module III:

Overview of Query Processing: Query Processing Problem, Objectives of Query Processing, Complexity of Relational Algebra Operations, Layers of Query Processing.

Query Decomposition and Optimization: Query Decomposition, Query Optimization, Centralized Query Optimization, Distributed Query Optimization Algorithms.

(8L)

Module IV:

Transaction Management and Concurrency Control: Definition of a Transaction, properties of Transactions, Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Locking-based Concurrency Control Algorithms, Timestamp-based Concurrency Control Algorithms, Deadlock Management.

(8L)

Module V:

Distributed DBMS Reliability: Reliability Concepts and Measures, Failures and Fault Tolerance in Distributed Systems, Failures in Distributed DBMS, Local Reliability Protocols, Distributed Reliability Protocols.

(8L)

Text Books:

1. M. Tamer Ozsu, Patrick Valduriez, "Distributed Database Systems", 2nd Edition, Pearson, 2011.

Reference Books:

1. ElmasriNavathe, "Fundamental of Database Systems", 5th Edition, Pearson Education, 2008.
2. Thomas Connolly, Carolyn Begg, "Database Systems – A Practical Approach to Design, implementation and Management", 4th Edition, Pearson Education, 2008.
3. Silberschatz, Korth, Sudarshan, "Database System Concepts", 4th Edition, McGraw Hill, 2002.

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Course code: CA433
Course title: Intrusion Detection System
Pre-requisite(s):
Co- requisite(s):
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: MCA
Semester / Level: II/4
Branch: MCA

Course Objectives

This course enables the students:

1.	To Understand Model of Intrusion Analysis
2.	To provide a brief description of security design principles.
3.	To evaluate physical solutions for preventing intrusion.
4.	To acquire knowledge on requirements of responses, types of responses and methodology of mapping responses policy.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Classify and Explain a network intrusion detection system.
CO2	Develop predictive measures to assess and prevent intrusion.
CO3	Assess implications of privacy, security and ethical issues as they pertain to organizations IT infrastructure.
CO4	Diagnosis possible hacks and purpose polices to outline what do when an intrusion occurs.
CO5	Integrate techniques to provide solutions for preventing intrusion.

SYLLABUS

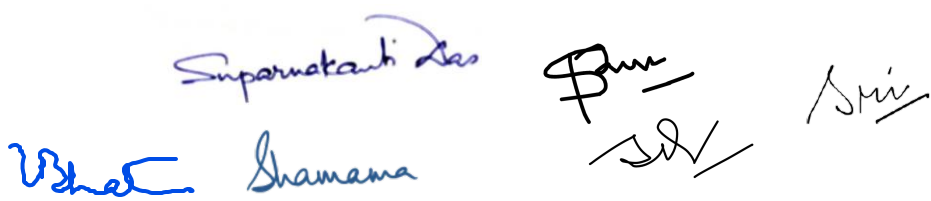
Module I:

Defining Intrusion Detection, The state of threats against computers, networked systems- Overview of computer security solutions Audit: setting, firewalls, VPN's Overview of Intrusion Detection and Intrusion Prevention-Network and Host-based IDS.

(8L)

Module-II:

Classes of attacks - Network layer: scans, denial of service, penetration-Application layer: software exploits, code injection-Human layer: identity theft, root access-Classes of attackers- Kids/hackers/sop Hesitated groups-Automated: Drones, Worms, Viruses.



(8L)

Module III:

A General IDS model and taxonomy, Signature-based Solutions, Snort, Snort rules, Evaluation of IDS, Cost sensitive IDS.

Anomaly Detection Systems and Algorithms-Network Behavior Based Anomaly Detectors (rate based)-Host-based Anomaly Detectors-Software Vulnerabilities- State transition, Immunology, Payload Anomaly Detection.

(8L)

Module IV:

Attack trees and Correlation of alerts-Autopsy of Worms and Botnets-Malware detection- Obfuscation, polymorphism-Document vectors.

(8L)

Module V:

Email/IM security issues-Viruses/Spam-From signatures to thumbprints to zero day, detection- Insider Threat issues-Taxonomy-Masquerade and Impersonation-Traitors, Decoys and Deception-Future: Collaborative Security.

(8L)

TEXT BOOKS:

1. The Art of Computer Virus Research and Defense, Peter Szor, Symantec Press ISBN 0-321-30545-3
2. Crimeware, Understanding New Attacks and Defenses, Markus Jakobsson and Zulfikar Ramzan, Symantec Press, ISBN: 978-0-321-50195-0 2008
3. Intrusion Detection by Rebecca Gurley Bace Macmillan Technical Publishing, 2000

REFERENCE BOOKS:

1. Intrusion Detection System by Robert D Petro Springer 2015

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Course code: CA435
Course title: MODERN ARTIFICIAL INTELLIGENCE
Pre-requisite(s):
Co- requisite(s):
Credits: 3 L: 3 T: 0 P: 0
Class schedule per week: 03
Class: MCA
Semester / Level: II/4
Branch: MCA

Course Objectives

This course enables the students to:

1.	Understand the importance of AI based systems.
2.	Use AI based techniques in real world problems.
3.	Design an intelligent system, component or process to meet desired needs with constraints.
4.	Create artificial intelligence systems for multidisciplinary domains.
5.	Work collaborate to formulate and solve engineering problems based on AI principles.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand the principles and approaches of artificial intelligence and different aspects of Intelligent agent.
CO2	Apply different search techniques for solving real world complex problems and select the most appropriate solution by comparative evaluation.
CO3	Design AI based systems and their components with reasoning even in the presence of incomplete and/or uncertain information.
CO4	Develop knowledge-based systems with proper representation schemes.
CO5	Analyze the pros and cons of different AI systems and their design.

SYLLABUS

MODULE-I

Introduction: Overview of Artificial Intelligence- Problems of AI, AI Technique, Tic - Tac - Toe Problem.

Intelligent Agents: Agents & Environment, Nature Of Environment, Structure Of Agents,

Goal Based Agents, Utility Based Agents, Learning Agents.

Problem Solving: Problems, Problem Space & Search: Defining The Problem As State Space Search, Production System, Problem Characteristics, Issues In The Design Of Search Programs. (8L)

MODULE-II

Search Techniques: Solving Problems by Searching, Problem Solving Agents, Searching For Solutions; Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Bi-directional Search, Comparing Uniform Search Strategies.

Heuristic Search Strategies: Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search, Simulated Annealing Search, Local Beam Search, Genetic Algorithms; Constraint Satisfaction Problems, Local Search For Constraint Satisfaction Problems.

Adversarial Search: Games, Optimal Decisions & Strategies in Games, The Mini Max Search Procedure, Alpha-Beta Pruning, Additional Refinements, Iterative Deepening.

(8L)

MODULE-III

Knowledge & Reasoning: Knowledge Representation Issues, Representation & Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation.

Using Predicate Logic: Representing Simple Fact in Logic, Representing Instant & ISA Relationship, Computable Functions & Predicates, Resolution, and Natural Deduction.

Representing Knowledge Using Rules: Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge

(8L)

MODULE-IV

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, Bayesian Networks, Dempster-Shafer Theory.

Planning: Overview, Components of A Planning System, Goal Stack Planning, Hierarchical Planning.

Learning: Forms of Learning, Inductive Learning, Explanation Based Learning, Neural Net Learning & Genetic Learning. (8L)

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MODULE-V

Natural Language Processing: Brief introduction to Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing.

Robotics: Introduction, Robot hardware, robotic perception, planning to move, planning uncertain movements, robotic software architecture, application domains.

(8L)

Text books:

1. Russel S. and Norvig P. "Artificial Intelligence a Modern Approach", 3rd Edition, Pearson Education.
2. Rich E. & Knight K. "Artificial Intelligence", 2nd Edition, TMH, New Delhi.

Course code: CA437

Course title: INFORMATION RETRIEVAL

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students to:

1.	To understand the basic component of information retrieval.
2.	To explore the application areas of information retrieval.
3.	To understand the idea of indexing and pre-processing of data.
4.	To explore the different IR evolution techniques.
5.	To understand the concepts of Query Expansion techniques.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Explain the working of a search engine and details of the individual
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	components.
CO2	Apply efficient techniques for the indexing of documents
CO3	Implement various indexing, scoring, ranking and relevance feedback models and techniques for information retrieval
CO4	Develop a complete IR system from scratch
CO5	Evaluate and analyse the performance of a retrieval systems using a suitable test collection

SYLLABUS

Module I

Introduction

Introduction; Search Engine Architecture; An overview of crawling, text transformation, index creation, user interaction, ranking, link analysis, evaluation and deep web.

(8L)

Module II

Pre-processing and Indexing

Pre-processing: tokenization, stop word, normalization, stemming, wildcard queries, spelling correction – edit distance and k-gram; Indexing: Index construction; Index compression.

(8L)

Module III

Scoring

Parametric and zone indexes; term frequency and weighting; vector space model; efficient scoring and ranking; vector space scoring.

(8L)

Module IV

IR Evaluation

Evaluation; Standard test collection; Evaluation of unranked and ranked retrieval; Assessing relevance; System quality and user utility.

(8L)

Module V

Relevance Feedback and Query Expansion

Relevance feedback and pseudo relevance feedback; query reformulation.

(8L)

Text book:

Manning, Christopher D., Raghavan Prabhakar, and SchützeHinrich, “Introduction to Information Retrieval”, Cambridge: Cambridge University Press, 2008.(T1)

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Reference books:

Grossman David A., Frieder Ophir “Information Retrieval: Algorithms and Heuristics”,

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Springer.(R1)

Croft Bruce, Metzler Donald, and Strohman Trevor “Search Engines: Information Retrieval in Practice”, Pearson Education, 2009.(R2)

Ricardo Baeza-Yates and Neto Berthier Ribeiro “Modern Information Retrieval”, 2nd Edition, Addison-Wesley, 2011.(R3)

Course code: CA439

Course title: IMAGE PROCESSING

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objective:

This course enables the students:

1.	Understand the fundamentals of digital image processing.
2.	Develop a Broad knowledge of Spatial and Frequency image transforms used for enhancing an image.
3.	Learn Image restoration techniques and noise models used for restoring an image.
4.	Understand Lossless and lossy image compression techniques.

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5.	Know Morphological processing algorithms for various operations on an image.
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Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand the concept of image formation, digitization and the role human visual system plays in perception of image data.
CO2	Acquire an appreciation for spatial and frequency based techniques for enhancing the appearance of an image duly applying them in different applications.
CO3	Discern the difference between noise models, gain an insight into assessing the degradation function and realize different spatial and frequency based filtering techniques for reduction and removal of noise.
CO4	Synthesize a solution to image compression using the concept of information theory and lossless and lossy compression techniques.
CO5	Design and create practical solutions using morphological operators for common image processing problems and assess the results.

SYLLABUS

MODULE -I

What Is Digital Image Processing, Fundamental Steps in Digital Image Processing , Components of an Image Processing System, Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.

(8L)

MODULE -II

Enhancements in Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Enhancements in Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphism Filtering

(8L)

MODULE -III

Image Restoration: A Model of the Image Degradation/Restoration Process, Noise Models. Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations.

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MODULE -IV

Image Compression: Fundamentals, Image Compression Models, Elements of Information Theory, Error-Free Compression, Lossy Compression.

(8L)

MODULE -V

Morphological Image Processing and Segmentation: Preliminaries, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation. Some Basic Morphological Algorithms, Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

(8L)

Text books:

1. Rafael. C. & Woods Richard E. "Digital Image Processing", 3rd Edition, Pearson Education, New Delhi, 2009.

Reference books:

1. Pratt W.K. "Digital Image Processing", 4th Edition, John Wiley & sons Inc., 2006.
2. Sonka M., Hlavac Vaclav, Boyle Roger "Image Processing, Analysis and Machine Vision", 2nd Edition, Thomson Learning, India Edition, 2007.
3. Jayaraman "Digital Image Processing", Tata McGraw. Hill Education, 2011.

Course code: CA441

Course title: Data Mining Techniques

Pre-requisite(s):

Co- requisite(s):

Credits: 3 L:3 T:0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: II/4

Branch: MCA

Course Objectives

This course enables the students:

1.	Examine the types of the data to be mined and apply pre-processing methods on raw data.
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2.	To introduce the basic concepts of Data Warehouse and Data Mining techniques
3.	Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data
4.	Prepare students for research in the area of data mining and related applications and Enhance students communication and problem solving skills
5.	Provide the students with practice on applying data mining solutions using common data mining software tool /programming languages.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Describe the fundamentals of data mining systems as well as issues related to access and retrieval of data at scale.
CO2	Explain the various data mining functionalities and data warehousing techniques.
CO3	Apply the various data mining techniques to solve classification, clustering and association rule mining problems.
CO4	Analyze and choose among different approaches of a data mining task.
CO5	Design and evaluate data mining models to be used in solving real life problems, keeping in view social impacts of data mining.

SYLLABUS

MODULE – I

Data Mining: Introduction, Relational Databases, Data Warehouses, Transactional databases, Advanced database Systems and Application, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction.

(8L)

MODULE – II

Data Warehouse: Introduction, A Multidimensional data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data Warehousing to Data Mining. Data Cube Computation and Data Generalization

(8L)

MODULE – III

Mining Association Rules in Large Databases: Association Rule Mining, Single – Dimensional Boolean Association Rules, Multilevel Association Rules from Transaction Databases, Multi Dimensional Association Rules from Relational Databases, From Association Mining to Correlation Analysis.

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MODULE – IV

Classification and Prediction: Classification & Prediction, Issues Regarding Classification & Prediction, Classification by decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification based on concepts & Association Rule Analysis, Other Classification Methods, Prediction, Classification Accuracy.

(8L)

MODULE – V

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Method - k- Medoids Algorithm, CLARANS, Hierarchical Methods - BIRCH, ROCK Density-Based Methods - DBSCAN, Outlier Analysis.

(8L)

Text books:

1. Jiawei Han & Micheline Kamber “Data Mining Concepts & Techniques”, Publisher Harcourt India. Private Limited, 3rd Edition.

Reference books:

1. Gupta G.K. “Introduction to Data Mining with case Studies”, PHI, New Delhi, 2006.
2. Berson A. & Smith S.J. “Data Warehousing Data Mining”, COLAP, TMH, New Delhi, 2004.
3. Dunham H.M. & Sridhar S. “Data Mining”, Pearson Education, New Delhi, 2006.

PROGRAM ELECTIVE II

Course code: CA519

Course title: MOBILE COMPUTING

Pre-requisite(s):

Co-requisite(s):

Credits: 3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

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Name of Teacher:

Course Objectives

This course enables the students:

1.	Understand basic mobile network concepts and its architectures.
2.	Know Protocols like mobile telephony and introduce to the concepts of bluetooth
3.	Comprehend the GSM architectures and its features that support mobile communications.
4.	Understand the network management and Middleware services used in Ip and Mobile telephony
5.	Get accustomed to the concepts like GPRS, 3G, 4G networks

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify the role of cellular networks in Mobile and Pervasive Computing
CO2	Analyse about the basic architecture for a pervasive computing environment
CO3	Assess the principles for routing and allocating the resources on the 3G-4G wireless network
CO4	Evaluate mobile computing applications based on the paradigm of context aware computing
CO5	Design and develop applications in mobile and pervasive computing environment

SYLLABUS

Module –I

Introduction: Basics of mobile networks, middleware and gateways, application and services, Mobile Computing Architecture: architecture for mobile computing, three tier architecture.

(8L)

Module –II

Mobile Computing through Telephony: evolution of telephony, multiple access procedures, mobile computing through telephone. Emerging Technologies: introduction, Bluetooth, radio frequency identification, wireless broadband, mobile IP, IPV6.

(8L)

Module –III

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Global System for Mobile Communications GSM: introduction, GSM architecture , call routing in GSM, GSM address and identifiers, network aspect in GSM, GSM frequency allocation, authenticity and security. Mobile computing over SMS.

(8L)

Module –IV

General Packet Radio Service GPRS:GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, applications for GPRS, limitations for GPRS, Wireless Application Protocol

Client Programming: introduction, moving beyond the desktop, a peak under the hood: hardware overview, mobile phone, PDA, design constraints in application for handheld devices.

(8L)

Module –V

CDMA and 3G, VoIP, call routing, voice over IP applications, IP multimedia subsystem, Mobile VoIP.

(8L)

Text Book:

1. Talukedar Ashok, Ahmed Hasan, YavagalRoopa R “Mobile Computing Technology, Applications and Service Creation”,Tata McGraw -Hill Education ,2010.

Reference Books:

1. Schiller Jochen H. “Mobile Communications”, 2nd Edition, Addison wesley.
2. Kamal Raj “MobileComputing”, 2nd Edition, Oxford University Press.
3. Behravanfar Reza “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, ISBN: 0521817331, Cambridge University Press, October 2004.
4. Adelstein Frank, Gupta Sandeep K.S., Richard III Golden G., Schwiebert, Loren, “Fundamentals of Mobile and Pervasive Computing”, ISBN: 0071412379, McGraw-Hill Professional, 2005.
5. Hansmann Uwe, MerkLothar, Nicklous Martin S., Stober Thomas “Principles of Mobile Computing”, 2nd Edition., Springer, 2003.

Course code: CA521

Course title: CYBER SECURITY

Pre-requisite(s):

Co-requisite(s):

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Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
2.	Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes
3.	Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools.
4.	E-evidence collection and preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand relevant legislation and codes of ethics.
CO2	Apply Computer forensics and digital detective and various processes, policies and procedures.
CO3	Understand E-discovery, guidelines and standards, E-evidence, tools and environment.
CO4	Learn the techniques of Email and web forensics and network forensics tools.
CO5	Integrate techniques to recover data from computer and hand held devices.

SYLLABUS

Module – I

Introduction to Cybercrime, Classifications of Cyber Crimes, Local and Global perspectives on Cybercrime, Cyber offences, Cyberstalking, Cyber crime and cloud computing, cyber crimes through hand held devices.

(8L)

Module-II

Cyber Security Vulnerabilities and Cyber Security Safeguards

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security

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Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Managemen.

(8L)

Module- III

Securing Web Application, Services and Servers

Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

(8L)

Module- IV

Intrusion Detection and Prevention

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

(8L)

Module-V

Cyberspace and the Law

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

(8L)

TEXT BOOKS:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and SunitBelpure, Publication WileyIndian Print 2014.
2. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill

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Course code: CA523

Course title: CLOUD COMPUTING

Pre-requisite(s):

Co-requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students to:

1.	Understand about security requirements in cloud.
2.	Learn about infrastructure security at different levels
3.	Know about management standards of cloud security
4.	Develop and Apply trust-based security model to different layers

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify security aspects of each cloud model
CO2	Implement a public cloud instance using a public cloud service provider
CO3	Apply trust-based security model to different layer
CO4	Develop a risk-management strategy for moving to the Cloud
CO5	Identify various research domain of cloud computing

SYLLABUS

Module I

Introduction: Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud and Virtualization - Cloud Services Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics Cloud Adoption. (8L)

Module II

Principles of Parallel and Distributed Computing: Eras of computing, Parallel vs. Distributed computing, Elements of parallel computing, Elements of distributed computing, Technologies for distributed computing. (8L)

Module III

Virtualization: Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples.

Storage virtualization:Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Centre. (8L)

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Module IV

Cloud computing architecture: Introduction, Cloud reference model, Types of clouds, Economics of the cloud, Open challenges. (8L)

Module V

Cloud platforms in industry and Cloud applications :Amazon web services, Google app engine, Microsoft azure, Observations, Scientific applications, Scientific, Business and Consumer applications. (8L)

Text Book:

Buyya Raj Kumar, Vecchiola Christian &Thamarai S. Selvi, “Mastering Cloud Computing”, McGraw Hill Publication, New Delhi, 2013.(T1)

Reference Books:

Velte T., Velte A. and Elsenpeter R., “Cloud Computing: A Practical Approach”, McGraw Hill, India.(R1)

Buyya R., Broberg J., “Cloud Computing: Principles and Paradigms”, Wiley.(R2)

Hwang K., Fox G. and Dongarra J., “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann, 2012.(R3)

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Course code: CA525
Course title: DEEP LEARNING
Pre-requisite(s):
Co- requisite(s):
Credits:3 L:3 T:0 P:0
Class schedule per week: 03
Class: MCA
Semester / Level:III/5
Branch: MCA
Course Objectives

This course enables the students:

1.	To understand the basic component of Machine Learning.
2.	To explore the application areas of Neural Networks.
3.	To understand the idea of Recurrent Neural Networks.
4.	To explore the basic concepts of Feed forward Neural Networks.
5.	To understand the concepts of mathematical modelling.

Course Outcomes

After the completion of this course, students will be:

CO1	Able to differentiate between machine learning and deep learning
CO2	Identify problems suitable for application of deep learning.
CO3	Illustrate the working of FF Neural Networks and their modifications.
CO4	Apply Convolutional & Recurrent Neural Networks to solve problems
CO5	Analyse the efficiency of deep learning systems.

Syllabus

Module I

Introduction and Basics of Machine Learning

Beginnings of ANN, XOR Problem, From Cognitive Science to Deep Learning, NNs and their importance. Elementary classification problem, evaluating classification results, Simple Classifier – Naïve Bayesian Classifier, Simple NN: Logistic Regression, Learning without Labels, Learning alternative representation of data – PCA.

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Module II

Feed forward Neural Networks:

Basic concept and terminology, Representing networks, Perceptron rule, Delta rule, From logistic regression to Backpropagation, Complete Feedforward NNs.

(8L)

Module III

Modifications & Extensions of FF Neural Nets

Regularization, L1 & L2 regularization, Learning Rate, Momentum and Dropout, Stochastic Gradient Descent and Online Learning, Problems with multiple hidden layers, Vanishing and exploding gradients.

(8L)

Module IV

Convolution & Recurrent Neural Networks

Introduction, Feature maps and Pooling, Building a complete convolutional neural network. Recurrent Neural Networks – Sequences of unequal length, Settings for learning with recurrent neural networks, Adding feedback loops and Unfolding neural networks, Elman Networks, LSTM

(8L)

Module V

Auto encoders

Learning Representations, Different Autoencoder Architectures, Stacking Autoencoders.

(8L)

Text book:

1. Skansi S., Introduction to Deep Learning - From Logical Calculus to Artificial Intelligence, 1st Edition, Springer International Publishing, 2018.

Reference book:

1. Buduma N., Fundamentals of Deep Learning, 1st Edition, O Reilly Media, 2016.

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Course code: CA527

Course title: COMPUTER VISION

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	Be familiar with both the theoretical and practical aspects of computing with images.
2.	Have described the foundation of image formation, measurement, and analysis.
3.	Understand the geometric relationships between 2D images and the 3D world.
4.	Grasp the principles of state-of-the-art deep neural networks

Course Outcomes

After the completion of this course, students will be able to:

CO 1	Developed the practical skills necessary to build computer vision applications.
CO 2	To have gained exposure to object and scene recognition and categorization from images.
CO 3	Develop algorithm for classification and clustering.
CO 4	Illustrate the techniques of feature extraction and analysis.
CO 5	Apply in different engineering application such activity recognition, computational photography, biometrics.

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Syllabus

Module I

Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.

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Module II

Edge detection, Edge detection performance, Hough transform, corner detection.

(8L)

Module III

Segmentation, Morphological filtering, Fourier transforms Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data preprocessing.

(8L)

Module IV

Pattern Analysis:

Clustering: K-Means, K-Medoids, Mixture of Gaussians Classification: Discriminate Function, Supervised, Un-supervised, Semi supervised Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods.

(8L)

Module V

Recent trends in Activity Recognition, computational photography, Biometrics.

(8L)

Text Books:

1. Szeliski, R., "Computer Vision: Algorithms and Applications," Springer, 2011.
2. Goodfellow, Bengio, and Courville, "Deep Learning," First Edition. MIT Press, 2016.
3. Fisher, R.B., Breckon, T. P. , Dawson-Howe, K., Fitzgibbon, A , Robertson, C., Trucco, E. , Williams, C. K. I., "Dictionary of Computer Vision and Image Processing," Second Edition, Wiley, 2014.

Reference Book:

1. Forsyth, D.A., Ponce, J., "Computer Vision A Modern Approach," Second Edition, Pearson Education, 2015.

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Course code: CA529

Course title: NETWORK SECURITY AND CRYPTOGRAPHY

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	To understand the foundations of cryptographic attacks.
2.	To gain knowledge of encrypting data, and to choose between different algorithms.
3.	Prepare students for research in the area of cryptography and enhance students communication and problem solving skills
4.	To differentiate between the encryption techniques and know their suitability to an application.
5.	To effectively apply their knowledge to the construction of secure cryptosystems.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand the various types of cryptographic attacks and the mathematics behind cryptography.
CO2	Describe the various types of ciphers and hash functions.

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CO3	Apply the different cryptographic techniques to solve real life problems.
CO4	Evaluate different techniques as to their suitability to various applications.
CO5	Develop a cryptosystem keeping in view social issues and societal impacts.

SYLLABUS

Module I

Foundations – Protocol Building Blocks - Basic Protocols - Intermediate Protocols - Advanced Protocols - Zero-Knowledge Proofs - Zero-Knowledge Proofs of Identity -Blind Signatures - Identity-Based Public-Key Cryptography.

(8L)

Module II

Key Length - Key Management – Public Key Cryptography versus Symmetric Cryptography - Encrypting Communications Channels - Encrypting Data for Storage - Hardware Encryption versus Software Encryption - Compression, Encoding, and Encryption - Detecting Encryption – Hiding and Destroying Information.

(8L)

Module III

Information Theory - Complexity Theory - Number Theory - Factoring - Prime Number Generation - Discrete Logarithms in a Finite Field - Data Encryption Standard (DES) – Lucifer - Madryga - NewDES - GOST – 3 Way – Crab – RC5 - Double Encryption - Triple Encryption - CDMF Key Shortening - Whitening.

(8L)

Module IV

Pseudo-Random-Sequence Generators and Stream Ciphers – RC4 - SEAL - Feedback with Carry Shift Registers - Stream Ciphers Using FCSRs - Nonlinear-Feedback Shift Registers - System-Theoretic Approach to Stream-Cipher Design - Complexity-Theoretic Approach to Stream-Cipher Design - N- Hash - MD4 - MD5 - MD2 - Secure Hash Algorithm (SHA) - OneWay Hash Functions Using Symmetric Block Algorithms - Using Public-Key Algorithms - Message Authentication Codes

(8L)

Module V

RSA - Pohlig-Hellman - McEliece - Elliptic Curve Cryptosystems -Digital Signature Algorithm (DSA) - Gost Digital Signature Algorithm - Discrete Logarithm Signature Schemes - Ongchnorr-Shamir -Cellular Automata - Feige-Fiat-Shamir -Guillou-Quisquater - Diffie-Hellman - Station-to-Station Protocol -Shamir’s Three-Pass Protocol - IBM Secret-Key Management Protocol -

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MITRENET - Kerberos - IBM Common Cryptographic Architecture.

(8L)

Text Books:

1. Schneier Bruce, "Applied Cryptography: Protocols, Algorithms, and Source Code in C", 2nd Edition, John Wiley & Sons, Inc, 1996.
2. Mao Wenbo, "Modern Cryptography Theory and Practice", Pearson Education, 2004.
3. KahateAtul, "Cryptography and Network Security", Tata McGrew Hill, 2003.

Reference Book:

1. Stallings William, "Cryptography & Network Security Principles and Practice", Pearson Education.

PROGRAM ELECTIVE III

Course code: CA539

Course title: PARALLEL COMPUTING

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students to:

1.	Learn different types of parallelisms achieved over different computer models
2.	Write parallel algorithms (and programs) for computer problems
3.	Map parallel algorithms from architecture to architecture
4.	Identify the issues in concurrency control

Course Outcomes

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After the completion of this course, students will be able to:

CO1	Analyze the need of concurrent execution of problems
CO2	Summarize the issues of concurrency control
CO3	Relate the parallel algorithm from organization to organization
CO4	Measure a range of parallel algorithms on different architectures.
CO5	Apply the concept parallelism in solving the problems of different domains

SYLLABUS

Module I

Introduction: Parallel Processing Environment- Pipelining and Data Parallelism, Flynn's Taxonomy, Speedup, Scaled Speedup, Analysing parallel algorithms, P-RAM Algorithms. (8L)

Module II

Processor Array, MIMD: Multiprocessors (shared) and Multi-computers (distributed), Networks(Processor organizations):Static and dynamic Interconnection Networks, Message Transferring procedures. (8L)

Module III

Mapping and Scheduling, Dynamic Load Balancing on Multi-computers, Static Scheduling on UMA Multiprocessors, Parallel Programming model using process and thread, Deadlock and Synchronization issues. (8L)

Module IV

Elementary Parallel Algorithm: Matrix Multiplication: Sequential Matrix Multiplication, Algorithms for Processor Array, Algorithms for Multiprocessors, Algorithms for Multi-computers. (8L)

Module V

Solving set of linear equations: Gaussian Elimination, The Jacobi Algorithm, Finding roots of non-linear equations, Sorting algorithms: Enumeration Sort, ODD-EVEN Transposition sort, BITONIC Merge, Quicksort Based Algorithms, Graph Algorithms. (8L)

Text books:

1. Quin M. J., Parallel Computing: Theory and Practice, McGraw Hill, New York, 1994.

Reference books:

1. Akl Selim G., The Design and Analysis of Parallel algorithms, Prentice Hall International.

Suparnika Das
Usha
Shamama
Siv
Smit

2. Sasikumar M., Shikhare D. and Prakash P. Ravi, Introduction to Parallel Processing, PHI, 2006.

Course code: CA541

Course title: DIGITAL FORENSIC

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
2.	Combines both the technical expertise and the knowledge required to

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Prakash P. Ravi
Shikhare D.

	investigate, detect and prevent digital crimes
3.	Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools.
4.	E-evidence collection and preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Understand relevant legislation and codes of ethics.
CO2	Apply Computer forensics and digital detective and various processes, policies and procedures.
CO3	To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.
CO4	Evaluate the techniques of Email and web forensics and network forensics tools.
CO5	examine digital evidences such as the data acquisition, identification analysis

SYLLABUS

Module – I

Computer forensics fundamentals, Benefits of forensics, computer crimes, computer forensics evidence and courts, legal concerns and private issues.

(8L)

Module-II

Understanding Computing Investigations – Procedure for corporate High-Tech investigations, understanding data recovery work station and software, conducting and investigations.

(8L)

Module- III

Data acquisition- understanding storage formats and digital evidence, determining the best acquisition method, acquisition tools, validating data acquisitions, performing RAID data acquisitions, remote network acquisition tools, other forensics acquisitions tools.

(8L)

Module- IV

Case studies Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation., specific tools and techniques, Forensic auditing.

(8L)

Module-V

Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations- investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool.

(8L)

TEXT BOOKS:

1. Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.
2. Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.

Course code: CA543

Course title: INTERNET OF THINGS(IoT)

Pre-requisite(s):

Co-requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

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Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students to:

1.	Understand the basic concept and the IoT Paradigm
2.	Know the state of art architecture for IoT applications
3.	Learn the available protocols used for IoT
4.	Design basic IoT Applications.
5.	Evaluate optimal IoT applications.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Identify the IoT Components and its capabilities
CO2	Explain the architectural view of IoT under real world constraints
CO3	Analyse the different Network and link layer protocols
CO4	Evaluate and choose among the transport layer protocols
CO5	Design an IoT application

SYLLABUS

Module I

IoT - An Architectural Overview

Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

(8L)

Module II

IoT Architecture - State of the Art

Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture

(8L)

Module III

IoT Data Link Layer & Network Layer Protocols

PHY/MAC Layer (3GPP MTC, IEEE 802.11, IEEE 802.15), WirelessHART,BluetoothLow Energy, Zigbee Smart Energy
Network Layer-IPv4, IPv6, 6LoWPAN

(8L)

Module IV

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Transport & Session Layer Protocols

Transport Layer (TCP, MPTCP, UDP,)

Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT.

(8L)

Module V

Layer Protocols & Security

Service Layer -oneM2M, ETSI M2M, security in IoT and M2M applications

(8L)

Text Books:

1. Holler Jan, TsiatsisVlasios, Mulligan Catherine, Avesand Stefan, Karnouskos Stamatis, Boyle David, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Waher Peter, "Learning Internet of Things", PACKT publishing, BIRMINGHAM-MUMBAI

Reference Books:

1. Reiter Bernd Scholz, Michahelles Florian, "Architecting the Internet of Things", Springer, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2.
2. Minoli Daniel, "Building the Internet of Things with IPv6 and MIPv6:".

Course code: CA545

Course title: NATURAL LANGUAGE PROCESSING

Pre-requisite(s):

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Co- requisite(s):

Credits: 3 L: 3 T: 0 P: 0

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	To understand the algorithms available for the processing of linguistic information and computational properties of natural languages.
2.	To conceive basic knowledge on various morphological, syntactic and semantic NLP tasks.
3.	To familiarize various NLP software libraries and data sets publicly available.
4.	To develop systems for various NLP problems with moderate complexity.
5.	To learn various strategies for NLP system evaluation and error analysis.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Describe the concepts of morphology, syntax, semantics, discourse & pragmatics of natural language.
CO2	Demonstrate understanding of the relationship between NLP and statistics & machine learning.
CO3	Discover various linguistic and statistical features relevant to the basic NLP task, namely, spelling correction, morphological analysis, parts-of-speech tagging, parsing and semantic analysis.
CO4	Develop systems for various NLP problems with moderate complexity.
CO5	Evaluate NLP systems, identify shortcomings and suggest solutions for these shortcomings.

SYLLABUS

MODULE-I

Introduction to NLP

NLP – introduction and applications, NLP phases, Difficulty of NLP including ambiguity; Spelling error and Noisy Channel Model; Concepts of Parts-of-speech and Formal Grammar of English.

(8L)

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MODULE-II

Language Modelling: N-gram and Neural Language Models

Language Modelling with N-gram, Simple N-gram models, Smoothing (basic techniques), Evaluating language models; Neural Network basics, Training; Neural Language Model, Case study: application of neural language model in NLP system development

(8L)

MODULE-III

Parts-of-speech Tagging

Parts-of-speech Tagging: basic concepts; Tagset; Early approaches: Rule based and TBL; POS tagging using HMM, Introduction to POS Tagging using Neural Model.

(8L)

MODULE-IV

Parsing

Basic concepts: top down and bottom up parsing, treebank; Syntactic parsing: CKY parsing; Statistical Parsing basics: Probabilistic Context Free Grammar (PCFG); Probabilistic CKY Parsing of PCFGs.

(8L)

MODULE-V

Semantics

Vector Semantics; Words and Vector; Measuring Similarity; Semantics with dense vectors; SVD and Latent Semantic Analysis; Embeddings from prediction: Skip-gram and CBOW; Concept of Word Sense; Introduction to WordNet

(8L)

Text books:

1. Jurafsky Dan and Martin James H. "Speech and Language Processing" ,3rd Edition, 2018.

Reference books:

1. Jurafsky D. and Martin J. H., "Speech and language processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition", 2nd Edition, Upper Saddle River, NJ: Prentice-Hall, 2008.
2. Goldberg Yoav "A Primer on Neural Network Models for Natural Language Processing".

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Course code: CA547

Course title: BIG DATA ANALYTICS

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level:III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	To provide an overview of approaches facilitating data analytics on huge datasets in different domain.
2.	To provide the knowledge on NoSQL and different partitioning method to handle large datasets.
3.	To provide an overview of Apache Hadoop and HDFS Concepts and Interfacing with HDFS
4.	To understand Map Reduce Jobs in Hadoop framework
5.	To provide the knowledge of various Hadoop based tool for processing large datasets.

Course Outcomes

After the completion of this course, students will be able to:

CO1	Describe big data and use cases from selected business domains
CO2	Explain NoSQL big data management
CO3	Install, configure, and run Hadoop and HDFS
CO4	Perform map-reduce analytics using Hadoop
CO5	Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

SYLLABUS

Module I

Introduction

What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine,

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advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewall analytics.

(8L)

Module II

Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schemaless databases, materialized views, distribution models, sharding, master-slave replication, peer peer replication, sharding and replication, consistency, relaxing consistency, version stamps, map-reduce, partitioning and combining, composing map-reduce calculations.

(8L)

Module III

Data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization, Avro, file-based data structures.

(8L)

Module IV

MapReduce workflows, unit tests with MRUnit, test data and local tests, anatomy of MapReduce job run, classic Map-reduce, YARN, failures in classic Map-reduce and YARN, job scheduling, shuffle and sort, task execution, MapReduce types, input formats, output formats.

(8L)

Module V

Hbase, data model and implementations, Hbase clients, Hbase examples, praxis.Cassandra, Cassandra data model, Cassandra examples, Cassandra clients, Hadoop integration, Pig, Grunt, pig data model, Pig Latin, developing and testing Pig Latin scripts. Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, HiveQL queries.

(8L)

Text Books:

1. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.

Reference Books:

1. Sammer ,E., "Hadoop Operations," O'Reilley, 2012

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2. Capriolo ,E., Wampler ,D., and Rutherglen ,J., "Programming Hive," O'Reilley, 2012
3. George ,L., "HBase: The Definitive Guide," O'Reilley, 2011
4. Gates ,A., "Programming Pig," O'Reilley, 2011

Course code: CA549

Course title: BLOCK CHAIN TECHNOLOGY

Pre-requisite(s):

Co- requisite(s):

Credits:3 L:3 T:0 P:0

Class schedule per week: 03

Class: MCA

Semester / Level: III/5

Branch: MCA

Course Objectives

This course enables the students:

1.	To provide an overview of the different blockchain technologies.
2.	To provide the knowledge on the need of blockchain and its applicability in real world problem.
3.	To provide the knowledge of cryptocurrency design and its security against scam ,fraud, hacking.
4.	To provide the ability to design and implement new ways of using blockchain for applications other than cryptocurrency.
5.	To be able to apply the knowledge gained through the course in actual blockchain development or blockchain contract developer

Course Outcomes

After the completion of this course, students will be able to:

CO1	Learn and explain the difference between centralized, decentralized network and blockchain.
CO2	Explain fundamental concepts of blockchain using hashes and consensus.
CO3	Understand the concept of mining in blockchains.
CO4	Understand the working of Bitcoin and its security.
CO5	Know about the different platforms for implementing blockchain and its varied application.

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SYLLABUS

Module I

Introduction to Blockchain Technology

Introduction to Blockchain, Trusted Third party for transactions, Difference between centralized, decentralized and distributed peer to peer networks, Types of Blockchain (Permission Blockchain vs. Permissionless Blockchain), History of Bitcoins.

(8L)

Module II

Fundamental concepts of Blockchain

Concepts of Block, Transactions, Hashes, Consensus. Hashes: Hash cryptography, Encryption vs. hashing, Transactions: Recording transactions, Digital Signature, Verifying and confirming transactions, Blocks and blockchain: Hash pointers, Blocks, Consensus building. Distributed consensus, Byzantine generals problem, Consensus mechanism: POW, POS, POB, POA, etc. Blockchain Architecture, Markle Root Tree.

(8L)

Module III

Mining and simulating blockchain

Mining and simulating blockchain: Game theory behind competitive mining. Incentives: mining and transaction fees, Energy expended in mining.

(8L)

Module IV

Bitcoin ad Security

Bitcoin: Bitcoin creation, exchanges. Wallets, security. Protecting blockchain from attackers. Forks – soft and hard, Blockchain security, Key Management in Bitcoin, Case studies.

(8L)

Module V

Platforms and Applications

Introduction to Blockchain platform: Ethereum, Hyperledger, IOTA, EOS, Multichain, Bigchain, CORDA, SOLIDITY, Designing a new blockchain, Distributed Application (DAPP).

Applications: E-Governance, Elections, File sharing, Micropayments

Challenges and Research Issues in blockchain.

(8L)

Text Books:

1. Bitcoin and Cryptocurrency technologies: a comprehensive introduction. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Princeton University Press, First edition,2016

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2. Blockchain Applications: A Hands-On Approach. ArshdeepBahga, Vijay Madiseti. VPT Publisher. First edition,2018.
3. Blockchain: Step – by – Step Guide to Understand by Paul Laurence, Createspace Independent Pub.

Reference Books:

5. Introducing Ethereum and Solidity Foundations of Cryptocurrency and Blockchain Programming for Beginners by Chris Dannen, Apress
6. Blockchain: The comprehensive beginner's guide by Frank Walrtin

Web References:

1. <https://bitcoin.org/bitcoin.pdf>
2. <https://blockchain.mit.edu/how-blockchain-works>

Suparnakanti Das
Ushant Shamama

Praveen
Sri



HOD Comp.Sc. & Engineering <hod.cse@bitmesra.ac.in>

BoS documents for approval

Kamta Nath Mishra <knmishra@bitmesra.ac.in>
To: "HOD Comp.Sc. & Engineering" <hod.cse@bitmesra.ac.in>

Mon, Oct 12, 2020 at 11:50 AM

Respected Prof. (Dr.) Vandana Madam

I fully agree with the proposed BCA and MCA syllabus.
Please find the attached signed mom-document.

Thanking you
With best regards

Dr. K. N. Mishra
CSE, BITD
[Quoted text hidden]

 **mom-signed.pdf**
483K



HOD Comp.Sc. & Engineering <hod.cse@bitmesra.ac.in>

Fwd: BoS Documents signed by Off campus Lalpur

Shamama Anwar <shamama@bitmesra.ac.in>

Wed, Oct 14, 2020 at 9:43 AM

To: "HOD Comp.Sc. & Engineering" <hod.cse@bitmesra.ac.in>, V Bhattacharya <vbhattacharya@bitmesra.ac.in>

Dear Mam,

PFA the signed MoM of BoS by Madam Amrita Priyam.

----- Forwarded message -----

From: **A Priyam** <apriyam@bitmesra.ac.in>

Date: Tue, Oct 13, 2020 at 1:37 PM

Subject: Re: BoS Documents for Signature

To: Shamama Anwar <shamama@bitmesra.ac.in>

Dear Shamama,

I have gone through the BCA and MCA syllabus. The same has been approved by me.

Please find the attached signed Minutes of Board of Studies Meeting.

Thanks and Regards

Amrita Priyam

On Tue, Oct 13, 2020 at 11:10 AM A Priyam <apriyam@bitmesra.ac.in> wrote:

Dear Shamama,

Approved.

Thank you

On Tue, Oct 13, 2020 at 9:36 AM Shamama Anwar <shamama@bitmesra.ac.in> wrote:

Dear Mam,

Please find attached the MoM of the BoS conducted on 28th September '20.

I request you to kindly sign the MoM document. In the attached BCA and MCA syllabus, you may send approval by email (with the MoM attached).

--

Regards,

Dr. Shamama Anwar

Assistant Professor,

Department of Computer Science and Engineering,

Birla Institute of Technology,

Mesra, Ranchi, Jharkhand - 835215.

Mobile No.: 09431103880

--

Dr. Amrita Priyam

Associate Professor

Dept. of Comp.Sc.& Engg.

10/14/2020

BIT Webmail Mail - Fwd: BoS Documents signed by Off campus Lalpur

BITEC , Lalpur, Ranchi.
Contact No. 9431361802

--

Dr. Amrita Priyam
Associate Professor
Dept. of Comp.Sc.& Engg.
BITEC , Lalpur, Ranchi.
Contact No. 9431361802

--

Regards,

Dr. Shamama Anwar

Assistant Professor,
Department of Computer Science and Engineering,
Birla Institute of Technology,
Mesra, Ranchi, Jharkhand - 835215.
Mobile No.: 09431103880



BoS MoM signed Offcampus AKS SS and SKDas.pdf
673K



HOD Comp.Sc. & Engineering <hod.cse@bitmesra.ac.in>

BoS documents for approval

K Lal <klal@bitmesra.ac.in>

Fri, Oct 9, 2020 at 11:38 PM

To: "HOD Comp.Sc. & Engineering" <hod.cse@bitmesra.ac.in>

Respected Madam,


I am sending an approved BCA and MCA syllabus along with mom as per the BoS conducted on 28th September '20.

Thanks and Regards

Kanhaiya Lal
BIT Patna

[Quoted text hidden]

3 attachments

 **mom-signed.pdf**
479K **Proposed_BCA_28_09_20-signed.pdf**
1970K **MCA Syllabus signed.pdf**
22490K



HOD Comp.Sc. & Engineering <hod.cse@bitmesra.ac.in>

Approved BoS documents

Madhavi Sinha <madhavisinha@bitmesra.ac.in>
To: "HOD Comp.Sc. & Engineering" <hod.cse@bitmesra.ac.in>

Fri, Oct 9, 2020 at 2:47 PM

Dear Madam,




I am approving the enclosed BCA and MCA syllabus as per the BoS conducted on 28th September '20.
The signed mom is enclosed herewith.

Regards

Dr. Madhavi Sinha
Associate Professor and In Charge
Dept. of Computer Science
Birla Institute of Technology
Jaipur Campus - Jaipur

--

3 attachments

-  **Proposed_BCA_28_09_20-signed.pdf**
1766K
-  **MCA Syllabus.pdf**
20155K
-  **mom-signed.pdf**
429K



HOD Comp.Sc. & Engineering <hod.cse@bitmesra.ac.in>

BoS documents for approval

Department CS <bitnoidacs@bitmesra.ac.in>

Mon, Oct 12, 2020 at 1:42 PM

To: "HOD Comp.Sc. & Engineering" <hod.cse@bitmesra.ac.in>

Respected Maam,

We are approving the enclosed BCA and MCA syllabus as per the BoS conducted on 28th September '20.
Please find enclosed the signed mom.

Thanks and Regards,

CSE Coordinators (Mr Anurag Joshi, Ms Seema Sharma)
Birla Institute Of Technology, Mesra
NOIDA Campus

[Quoted text hidden]

 **mom-signed.pdf**
526K

Annexure - XI



Dean Academic Programe <dean.ap@bitmesra.ac.in>

Fwd: Letter for AC Meeting

SS Solanki <sssolanki@bitmesra.ac.in>
To: Dean Academic Programe <dean.ap@bitmesra.ac.in>
Cc: Registrar BIT <registrar@bitmesra.ac.in>

4 November 2020 at 14:45

Dear Madam

Please include the same in upcoming AC meeting.

Thanks and regards

----- Forwarded message -----

From: **Niraj Kumar** <nirajkumar@bitmesra.ac.in>
Date: Wed, Nov 4, 2020, 1:30 PM
Subject: Letter for AC Meeting
To: SS Solanki <sssolanki@bitmesra.ac.in>

Dear Sir,
Plz find attached herewith Letter for inclusion of agenda for 104th AC Meeting

--

NIRAJ KUMAR
ASSISTANT PROFESSOR
UNIVERSITY POLYTECHNIC
BIT, MESRA, RANCHI,
JHARKHAND, INDIA
MOBILE NO.- 8092483692

2 attachments

Letter for AC Meeting.docx
12K



Approval from Vice Chancellor.pdf
770K

**UNIVERSITY POLYTECHNIC
BIT, MESRA**

Ref. No.\BIT-UP\2020-21

Date : 04.11.2020

To,
The Dean(AP),
BIT, Mesra

Subject: Request to include missing agenda in 104th Academic Council Meeting.

Madam,

We have applied for change in the name of branch of Manufacturing Engineering to Mechanical Engineering Production and Electronics Engineering to Electronics and Communication Engineering after approval from the Vice-Chancellor.

I request you to kindly include the approval of the change in nomenclature of branch name in the agenda for 104th Academic Council Meeting.

Thanking you with regards,

Prof.(Dr.) S.S.Solnaki
Director

ISSUED
No. 45385
3 MAR 2020
-VC Office

4333

ISSUED
No. 4930
05 MAR 2020
Dean, Academic Programming Office
B.I.T., Mesra

**BIRLA INSTITUTE OF TECHNOLOGY
UNIVERSITY POLYTECHNIC
MESRA : RANCHI**

Ref:- BIT/UP/2020-21/ 722

To,
The Vice Chancellor
BIT-Mesra

RECEIVED
No. 13112
10 3 MAR 2020
Dean, Academic Programming Office
B.I.T., Mesra

Received
No. 45478
05 MAR 2020
V.C. Office BIT, Mesra

Sub:- Processing fee of Rupees Fifty Thousand may be paid online to AICTE for the change in name of Branch.

Sir,
It may kindly be noted that a sum of Rs. 50000/- (Rupees Fifty thousand) is required to be paid online through Corporate Internet Banking to AICTE towards Processing Fee for the change in name of Branch.

Copy of processing fee payment downloaded from the AICTE website is enclosed.

The detail of payment is given:

Particulars	Amount
Change in name of Branch	Rs. 50000/-
Permanent Institute ID	1-461324461

ISSUED
No. 13112
10 3 MAR 2020
VC Office

In view of the above, necessary approval may kindly be accorded.
Thanking you with kind regards.

Yours sincerely

[Signature]
Prof. (Dr.) S. S. Solanki
Director

27.2.2020
Dear (HP) Which branch
Pl Advise. name to be changed?

Received
No. 45385
27 FEB 2020
V.C. Office BIT, Mesra

VC Sir
The name change request
is:

- ① Manufacturing To Mesh Egg Products
- ② Electronics Egg To

AK nam
27/2/20
approving
AK nam
21/3/2020 Per + H.A. Approved.
ECE
(Pl find the request letter labelled)
Maybe
P/K
25/3/20

UNIVERSITY POLYTECHNIC
BIT, MESRA

Ref. No. BIT-UP/2020-21/718

Date: 12.02.2020

To,
The Vice-Chancellor
BIT, Mesra, Ranchi

274
Rajul
12/2/20

Director's Request Let
NO 6111
14 FEB 2020
VC Office

Subject: Permission for change in the name of courses.

Sir,
As per the norms of AICTE we can apply for change in the name of the courses. As we are getting fewer students in Manufacturing Engineering we wish to change the name of Manufacturing Engineering branch to Mechanical Engineering Production. We also wish to change name of Electronics Engineering branch to Electronics and Communication Engineering for better prospects of students.

Processing fee of Rs 50000/- is applicable for change of name of course for Private Institutes.

We have to submit resolution from University and Trust for the said purpose.

We request you to kindly accord approval for the change of the name of the aforesaid courses.

Thanking you with regards,

Prof. (Dr.) S. S. Solanki
Director

12.2.2020

15305
181644212
25 FEB 2020
2-3-2020
VC Office

Dean (A & C) ②
PI Comment
PPK
25/2/20

① Dean (AP)
Kindly advise.
JK

1372/2020

Received
No. 45795
13 FEB 2020
VC Office, Mesra

③ To Dean (AP)
May be permitted.
Sandip Butta
27/02/2020

Director, UPT
P10 ④

12906/13045
22.2.2020 14/4/20



Dean Academic Programme <dean.ap@bitmesra.ac.in>

Fwd: Extension of Approval 2020-21

AR (AP) <ar.ap@bitmesra.ac.in>

5 November 2020 at 12:19

To: Dean Academic Programme <dean.ap@bitmesra.ac.in>

----- Forwarded message -----

From: **SS Solanki** <sssolanki@bitmesra.ac.in>
Date: Thu, 5 Nov 2020, 12:17 pm
Subject: Fwd: Extension of Approval 2020-21
To: AR (AP) <ar.ap@bitmesra.ac.in>

----- Forwarded message -----


From: **Niraj Kumar** <nirajkumar@bitmesra.ac.in>
Date: Fri, Jun 26, 2020, 10:23 PM
Subject: Extension of Approval 2020-21
To: SS Solanki <sssolanki@bitmesra.ac.in>, Rakesh Kumar <rakniru@gmail.com>, Ramnish Sinha <ramnish@bitmesra.ac.in>

Dear Sir,
Plz find attached herewith EOA 2020-21.

With regards,

--

NIRAJ KUMAR
ASSISTANT PROFESSOR
UNIVERSITY POLYTECHNIC
BIT, MESRA, RANCHI,
JHARKHAND, INDIA
MOBILE NO.- 8092483692

 **EOA_Report_2020-21 (1).PDF**
213K

All India Council for Technical Education

(A Statutory body under Ministry of HRD, Govt. of India)

Nelson Mandela Marg, Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org



APPROVAL PROCESS 2020-21

Extension of Approval (EoA)

F.No. Eastern/1-7012635824/2020/EOA

Date: 15-Jun-2020

To,

The Principal Secretary (Science & Tech. Deptt.)
Govt. of Jharkhand Nepal House,
Dhurwa, Ranchi-834002

Sub: Extension of Approval for the Academic Year 2020-21

Ref: Application of the Institution for Extension of Approval for the Academic Year 2020-21

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations 2020 notified by the Council vide notification number F.No. AB/AICTE/REG/2020 dated 4th February 2020 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-461324461	Application Id	1-7012635824
Name of the Institution	UNIVERSITY POLYTECHNIC, BIT, MESRA	Name of the Society/Trust	BIRLA INSTITUTE OF TECHNOLOGY
Institution Address	OPPOSITE INDUSTRIAL ESTATE BIT-STEP, MESRA, RANCHI, RANCHI, Jharkhand, 835215	Society/Trust Address	BIRLA INSTITUTE OF TECHNOLOGY, P.O- MESRA, RANCHI, RANCHI, Jharkhand, 835215
Institution Type	Govt aided	Region	Eastern

To conduct following Courses with the Intake indicated below for the Academic Year 2020-21

Program	Level	Course	Affiliating Body (University /Body)	Intake Approved for 2019-20	Intake Approved for 2020-21	NRI Approval Status	PIO / FN / Gulf quota/ OCI/ Approval Status
ENGINEERING AND TECHNOLOGY	DIPLOMA	AUTOMOBILE ENGINEERING	Birla Institute of Technology, Ranchi	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	COMPUTER ENGINEERING	Birla Institute of Technology, Ranchi	30	30	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	ELECTRONICS AND COMMUNICATIONS ENGINEERING	Birla Institute of Technology, Ranchi	30	30	NA	NA

ENGINEERING AND TECHNOLOGY	DIPLOMA	MECHANICAL ENGINEERING	Birla Institute of Technology, Ranchi	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	MECHANICAL ENGINEERING PRODUCTION	Birla Institute of Technology, Ranchi	30	30	NA	NA
ENGINEERING AND TECHNOLOGY	DIPLOMA	ELECTRICAL AND ELECTRONICS ENGINEERING	Birla Institute of Technology, Ranchi	30	60	NA	NA
ENGINEERING AND TECHNOLOGY	UNDER GRADUATE	MEDICAL LAB TECHNOLOGY	Birla Institute of Technology, Ranchi	30	30	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2020-21 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2020-21 is implemented without affecting the reservation percentages of SC/ ST/ OBC/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years beginning with the Academic Year 2020-21
2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time now amalgamated as total intake shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2020-21 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE.
3. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.
4. Strict compliance of Anti-Ragging Regulation: - Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 373/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Jharkhand**
2. **The Registrar**,**

Birla Institute Of Technology, Ranchi

3. **The Principal / Director,**
UNIVERSITY POLYTECHNIC, BIT, MESRA
Opposite Industrial Estate Bit-Step, Mesra,
Ranchi,Ranchi,
Jharkhand,835215
4. **The Secretary / Chairman,**
BIRLA INSTITUTE OF TECHNOLOGY, P.O-MESRA
RANCHI,RANCHI
Jharkhand,835215
5. **The Regional Officer,**
All India Council for Technical Education
College of Leather Technology Campus
Block LB, Sector III, Salt Lake City
Kolkata - 700 098, West Bengal
6. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at <http://www.aicte-india.org/>

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

Annexure - XII



Ref: BT/HOD/20-21/033

Date: 05.11.2020

To
The Dean
Academic Programme
BIT, Mesra

Subject: Agenda for Academic Council (AC) Meeting, Minutes of Departmental Academic Committee (DAC) and Minutes of Departmental Policy Committee (DPC) for the closure of the Programme M.Tech (Bio-Medical Instrumentation and M.Sc (Bioinformatics))

Dear Madam,

Please find enclosed herewith the Agenda for Academic Council (AC), Minutes of Departmental Academic Committee (DAC) and Minutes of Departmental Policy Committee (DPC) for the closure of the programme M.Tech (Bio-Medical Instrumentation and M.Sc (Bioinformatics)) for your kind perusal.

Kindly acknowledge the same

Thanking you

With regards

(Dr. Ramesh Chandra)

- Enclosure: 1. Agenda for Academic Council (AC) Meeting
2. Minutes of Departmental Academic Committee (DAC)
3. Minutes of Departmental Policy Committee (DPC)

AC Agenda Format

Department: Bioengineering

Agenda: Closure of Two programmes of Department

1. M.Tech (Biomedical Instrumentation)
2. M.Sc (Bioinformatics)

November 05, 2020

Minutes of DAC Meeting

A meeting of Departmental Academic Committee is held on 05/11/2020 in the Department of Bioengineering to discuss the issue of running /closing of Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics). Members discussed the different aspects of the issue and opined followings.

1. As there are no admission in the M.Tech (Biomedical Instrumentation) for last five years in the program. Hence, it is recommended to close the program.
2. Further, in the program M.Sc (Bioinformatics) also, there were no admission for last five years. Therefore, it is recommended to close the program.

Based upon above, DAC of Bioengineering resolves that Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics) should be closed. This recommendation should be placed in Policy committee of Bioengineering for further processing.

Jayaram
Dr. Jayaram Kumar
(Prof. Pharm Sc & Tech)

AKSen
Dr. Akhil K Sen
(Asso. Prof. Chemical Engg)

Dr. Shubha R Sharma
(Asst. Prof. Bioengineering)

Vinod
Dr. Vinod K Nigam
(Asso. Prof. Bioengineering)

Dr. Manish Kumar
(Asso. Prof. Bioengineering)

Rakesh
Dr. Rakesh K Sinha
(Prof. Bioengineering)

Kunal Mukhopadhyay
Dr. Kunal Mukhopadhyay
(Prof. Bioengineering)

Dr. Padmini Padmanabhan
(Prof. Bioengineering)

05/11/2020
Dr. Ramesh Chandra
Prof. & HOD Bioengineering
Chairman DAC

★ M.Sc (Bioinformatics) was not advertised and hence there were no applications. Hence, it can't be considered as "Nil Admission"

P. P. Pad
05/11/20

November 05, 2020

Minutes of DAC Meeting

A meeting of Departmental Academic Committee is held on 05/11/2020 in the Department of Bioengineering to discuss the issue of running /closing of Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics). Members discussed the different aspects of the issue and opined followings.

1. As there are no admission in the M.Tech (Biomedical Instrumentation) for last five years in the program. Hence, it is recommended to close the program.
2. Further, in the program M.Sc (Bioinformatics) also, there were no admission for last five years. Therefore, it is recommended to close the program.

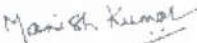
Based upon above, DAC of Bioengineering resolves that Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics) should be closed. This recommendation should be placed in Policy committee of Bioengineering for further processing.

Dr. Jairam Kumar
(Prof. Pharm Sc & Tech)

Dr. Akhil K Sen
(Asso.Prof. Chemical Engg)

Dr. Shubha R Sharma
(Asst. Prof. Bioengineering)

Dr. Vinod K Nigam
(Asso. Prof. Bioengineering)


Dr. Manish Kumar
(Asso. Prof. Bioengineering)

Dr. Rakesh K Sinha
(Prof. Bioengineering)

Dr. Kunal Mukhopadhyay
(Prof. Bioengineering)

Dr. Padmini Padmanabhan
(Prof. Bioengineering)

Dr. Ramesh Chandra
Prof. & HOD Bioengineering
Chairman DAC

November 05, 2020

Minutes of DAC Meeting

A meeting of Departmental Academic Committee is held on 05/11/2020 in the Department of Bioengineering to discuss the issue of running /closing of Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics). Members discussed the different aspects of the issue and opined followings.

1. As there are no admission in the M.Tech (Biomedical Instrumentation) for last five years in the program. Hence, it is recommended to close the program.
2. Further, in the program M.Sc (Bioinformatics) also, there were no admission for last five years. Therefore, it is recommended to close the program.

Based upon above, DAC of Bioengineering resolves that Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics) should be closed. This recommendation should be placed in Policy committee of Bioengineering for further processing.

Dr. Jairam Kumar
(Prof. Pharm Sc & Tech)

Dr. Akhil K Sen
(Asso.Prof. Chemical Engg)

Dr. Shubha R Sharma
(Asst. Prof. Bioengineering)

Dr. Vinod K Nigam
(Asso. Prof. Bioengineering)

Dr. Manish Kumar
(Asso. Prof. Bioengineering)

Dr. Rakesh K Sinha
(Prof. Bioengineering)

Dr. Kunal Mukhopadhyay
(Prof. Bioengineering)

Dr. Padmini Padmanabhan
(Prof. Bioengineering)

Dr. Ramesh Chandra
Prof. & HOD Bioengineering
Chairman DAC

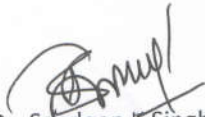
November 05, 2020


Minutes of DPC Meeting


A meeting of Departmental Policy Committee is held on 05/11/2020 at 11.00 am in the Department of Bioengineering to discuss the issue of closing of Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics). Members discussed the different aspects of the issue and opined followings.


1. As there are no admission in the M.Tech (Biomedical Instrumentation) for last five years in the program. Hence, it is recommended to close the program.
2. Further, in the program M.Sc (Bioinformatics) also, there were no admission for last five years. Therefore, it is recommended to close the program. //*

Based upon above, DPC of Bioengineering resolved that Departmental Programmes M.Tech (Biomedical Instrumentation) and M.Sc (Bioinformatics) should be closed. This recommendation should be placed in Academic council of the Institute for further processing.



Dr. Sandeep K Singh
(Asso. Prof. Pharm Sc & Tech)



Dr. Ashoke Sharon
(Asso. Prof. Chemistry)


Dr. V K Nigam
(Asso. Prof. Bioengineering)


Dr. Shashwati G Sachan
(Asst. Prof. Bioengineering)

Dr. Padmini Padmanabhan
(Prof. Bioengineering)


Dr. Rakesh K Sinha
(Prof. Bioengineering)


Dr. Ramesh Chandra
Prof. & HOD Bioengineering
Chairman DPC

*// M. Sc (Bioinformatics) was not advertised and hence there were no applications. Hence it can't be considered as "ML Admission".
PPS
05/11/20

Annexure - XIII

ANNEXURE 1

COURSE INFORMATION SHEET

Course code: SR 510
Course title: Fundamentals of Aerospace Engineering
Pre-requisite(s): NA
Co-requisite(s): NA
Credits: L:3 T:0 P:0
Class schedule per week: 03
Class: M.Tech.
Semester / Level: I/II/05
Branch: Space Engg. & Rocketry
Name of Teacher:

Course Objectives

This course enables the students to:

1.	Understand the basics of fluid dynamics and aircraft aerodynamics
2.	Understand the concept of high speed aerodynamics
3.	Describe various types of airbreathing propulsion system with their merits and challenges.
4.	Classify various types of chemical rocket propulsion and their various parameters governing it.
5.	Describe the fundamentals of orbital mechanics and motion in space

Course Outcomes

At the end of the course, a student should be able to:

CO1	Implementation of basic concept of fluid dynamics and aircraft aerodynamics for analysing the operational parameters of hydraulic problems and aircraft performance
CO2	Implementation of basis of high speed aerodynamics for simple problem solving
CO3	Analyze the propulsion system along with performance parameters for solving the designing challenges.
CO4	Understand and examine various parameters used in a chemical rockets, especially in solid rocket motor and a liquid rocket engine.
CO5	Analyze space dynamics and its effects on motions in space

M.K. Laha
(M.K. Laha)
06-01-2020

P. Patthak
6/1/2020
(P. Patthak)

G.P. Mishra
6.1.2020
(G.P. Mishra)

Rajiv Karmay
6/1/2020
(Dr. Rajiv Karmay)

Dr. Rajiv Karmay
6/1/2020

P.P.
6/1/20

Mohan Varma
06.1.20

Module I:**Fluid dynamics and basics of aerodynamics:**

Fluid Dynamics: Continuity equation, Basic laws of fluid dynamics – conservation of mass and momentum, conservation of energy, Real fluid flow, Viscosity, Determination of losses, Reynolds experiment, Laminar and turbulent flow, Boundary layer, Velocity profile, Flow past a body, Flow Separation, Airfoils & Wings, Generation of Lift, Drag & Moment

[8L]

Module II:**Aerodynamics of high speed flights:**

Flow regimes, compressible flow, Speed of sound, Normal shock, oblique shock, expansion fans, governing equation for quasi one dimensional flow, Nozzle, Supersonic Wind tunnels.

[6L]

Module III:**Air-breathing Propulsion:**

Principles of propulsion, Various air-breathing propulsion systems: Piston Engine-propeller, Turbojet, Turbo-prop, Turbofan, Turboshift, Pulsejet, Ramjet and Scramjets, Thrust and other performance parameters, Efficiencies, Cycle analysis.

[8L]

Module IV:**Non-air breathing Propulsion:**

Introduction, Classifications of rockets, Description and Application; Various propulsive devices used for aerospace applications, Chemical, Electrical, Nuclear and other Advanced Propulsion Systems. Basic requirements, Thrust and velocity increment equations; Specific Impulse, Thrust Coefficient, Characteristic Velocity and other Performance Parameters.

[8 L]

Module V:**Motion of bodies in Space:**

Simplified Vertical Trajectory, Burn-out Velocity and Burn-out Height; Motion of a body in a Gravitational Field, Orbits and Trajectories; Conic Sections; Kepler's Laws of Satellite Motion; Orbital Velocity of Satellites; Orbital Periods; Eccentric Elliptical Orbits; Geosynchronous and geostationary orbits, Energy and velocity requirements to reach a particular orbit, Escape velocity, Free falling bodies.

[10L]

Text books:

1. Fundamentals of Aerodynamics – Anderson, J. D., Tata McGraw-Hill Education, New Delhi, 2007. (T1)
2. Understanding Chemical Rocket Propulsion, Mukunda, H.S., I K International Publishing House, 2017. (T2)
3. Rocket Propulsion Elements, Sutton, G.P., Biblarz, O., 7th Ed. John Wiley & Sons, Inc., New York, 2001. (T3)
4. Source book on the Space Science, Glasstone, S, 1st Edition D. Van Nostrand Co., 1965. (T4)

Reference books:

1. Rocket Propulsion, Ramamurthi, K., 2nd Edition, Trinity Press of Laxmi Publications Private Limited, India, 2016. (R1)

N.K. Laha
(N.K. Laha)

P. Pathak
(P. Pathak)

G. Singh
(G. Singh)

C.P. Mishra
(C.P. Mishra)

Rajiv Kumar
(Rajiv Kumar)

Neha Verma
06.1.20

R.P. Kumar
(R.P. Kumar)

- Mechanics and Thermodynamics of Propulsion, Hill P. and Peterson C., 2nd Edition, Pearson Publisher. 1991. (R3)
- Introduction to Flight, Anderson, J. D., 5th Edition, Tata McGraw-Hill Education, New Delhi, 2007. (R4)
- Rocket and Spacecraft Propulsion: Principle, Practice and New Developments, Turner, M. J. L., Springer Verlag. 2000. (R2)

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus: PO3, PO6

Topics beyond syllabus/Advanced topics/Design
Types of Error in the Measurements

POs met through Topics beyond syllabus/Advanced topics/Design: PO4, PO6

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION PROCEDURE

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Continuous Internal Assessment	50
Semester End Examination	50

Continuous Internal Assessment	% Distribution
3 Quizzes	30 % (3 × 10%)
Assignment (s)	10
Seminar before a committee	10

Assessment Components	CO1	CO2	CO3	CO4	CO5
Continuous Internal Assessment					
Semester End Examination					

Indirect Assessment –

- Student Feedback on Faculty
- Student Feedback on Course Outcome

Course Delivery methods

CD1	Lecture by use of boards/LCD projectors/OHP projectors
CD2	Assignments/Seminars
CD3	Laboratory experiments/teaching aids
CD4	Industrial/guest lectures
CD5	Industrial visits/in-plant training

M.K. Laha
M.K. Laha

[Signature]
[Signature]

[Signature]

[Signature]

Rajiv Kumar
Rajiv Kumar

Mohan Kumar
Mohan Kumar
06.1.20

CD6	Self- learning such as use of NPTEL materials and internets
CD7	Simulation

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	1	1	3
CO2	1	1	2	1	-	3
CO3	1	1	2	2	1	3
CO4	3	2	3	1	-	2
CO5	1	-	2	-	1	1

If satisfying ,< 34% = 1, 34-66% = 2, >66% = 3

Mapping Between COs and Course Delivery (CD) methods

Course Outcome	Course Delivery Method
CO1	CD1,CD2,CD3, CD6
CO2	CD1, CD3, CD6
CO3	CD1, CD6
CO4	CD1, CD2, CD3, CD6
CO5	CD1,CD3, CD6

M.K. Laha
M.K. Laha

M. Pathak




Rajiv Kumar
 (Rajiv Kumar)

Mohan Varma
 Mohan Varma
 06.1.20



ANNEXURE 2

COURSE INFORMATION SHEET

Course code: SR 511
Course title: Fundamentals of Fuels and Combustion
Pre-requisite(s): NA
Co-requisite(s): NA
Credits: L: 3 T: 0 P: 0 C: 3
Class schedule per week: 3
Class: M.Tech.
Semester / Level: I or II/05
Branch: Space Engg. & Rocketry
Name of Teacher:

Course Objectives

This course enables the students to:

1.	Introduction to the various classification of fuel energy sources
2.	Identify the manufacture methods of various types of derived fuels and their applicability in the fuel industry
3.	Understand the concept of thermochemistry, enthalpy, adiabatic flame temperature, ignition, combustion products and their application to combustion related problems
4.	Apply the concept of chemical rates of reaction, collision theory and Arrhenius equation for analysing the different types of reactions.
5.	Compare the properties and characteristics of different type of flames and apply the same to combustion phenomenon in rocket motors and its exhaust.

Course Outcomes

At the end of the course, a student should be able to:

CO1	Classification of various fuel energy sources and their ways of utilization
CO2	Analyse the various types of derived fuels with methods of manufacture and their utilization
CO3	Apply the basic concept of thermochemistry, adiabatic flame temperature and ignition to combustion related problems
CO4	Demonstrate the utilization of the concept of chemical kinetics in combustion reactions.
CO5	Distinguish between premixed, diffusion flames and laminar and turbulent flames and their use in combustion devices.

M.K. Laha
(M.K. Laha)
06-01-2020

P. Pathak
6/1/2020
(P. Pathak)

Rajiv Kumar
6/1/2020
(Rajiv Kumar)

G. Sankhu
21/1/2020
(G. Sankhu)
Mohan Varma
06.1.20

Dr. D. I. Mishra
(Dr. D. I. Mishra)

R. Kumar
6/1/20
(R. Kumar)

Module I:

Fuels and their classification: Different fuel energy sources, Classification of fuels sources -Non-renewable and Renewable fuels, primary fuels and secondary fuels and solid, liquid and gaseous fuels. [6L]

Module II:

Manufactured fuels and derived fuels: Manufactured liquid and gaseous fuels. Derived fuels from coal- coal gasification, liquefaction and carbonization of coal, refuse derived fuels, bio-fuels, biomass, algae, bio-diesel, alcohol fuels [8L]

Module III:

Thermochemistry: Stoichiometry; Absolute Enthalpy and Enthalpy of Formation, Enthalpy of Combustion, Pressure and Temperature Effect on Enthalpy of Formation, Adiabatic Flame Temperature, Chemical and Equilibrium Products of Combustion, Some Applications, Ignition-Self Ignition and Forced Ignition, Factors affecting Ignition Energy. [8L]

Module IV:

Combustion Kinetics: Rate and order of Reaction; First, Second and Third Order Reaction, Reversible Reactions, Arrhenius Equation, Molecular Kinetics: Molecularity and Order, Theories of Collision, Chain Reaction, Equilibrium constants and their Relationship, Combustion Products in Equilibrium, Gibbs phase rule. [10L]

Module V:

Flames and Combustion: Concept of Flame; Classification and Properties of Premixed Flames; Properties of Diffusion Flames; Measurement of Burning Velocity, Flame Stabilization; Structure of Laminar Flame, Flame Propagation in Tubes, Description of Turbulent Flames, Concept of Turbulent Flow; Turbulent Burning Velocity, Solid fuel combustion and Liquid droplet combustion. [8L]

Text Books:

1. S. Sarkar, Fuels and Combustion, Orient Longman, 2nd edition, 1990. (T1)
2. Fuels & Combustion – Sharma, S.P. & Mohan, C., Tata- McGraw Hill, 1984. (T2)
3. S. R. Turn, An Introduction to Combustion - Concepts and Applications, 3rd Edition, McGraw-Hill, India, 2012. (T3)

Reference Books:

1. J.G. Speight, The Chemistry and Technology of Coal, CRC Press. 2013. (R1)
2. J.G. Speight, The Chemistry and Technology of Petroleum, 4th Edition, CRC Press. 2006 (R2)
3. K. K. Kuo, Principles of Combustion, John Wiley and Sons, New York, 1986. (R3)

Gaps in the syllabus (to meet Industry/Profession requirements):

M.K. Lahe
(M.K. Lahe)

P. Pathak
(P. Pathak)

Mohan Verma
06.1.20

[Signature]

[Signature]

Rajiv Kumar
(Rajiv Kumar)

[Signature]

Petroleum fuels and their distillation process not included

POs met through Gaps in the Syllabus: PO5 will be met through assignment and seminar/presentation.

Topics beyond syllabus/Advanced topics/Design: Detonation not covered in this syllabus.

POs met through Topics beyond syllabus/Advanced topics/Design: PO4, PO6

COURSE OUTCOME (CO) ATTAINMENT ASSESSMENT TOOLS & EVALUATION PROCEDURE

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Continuous Internal Assessment	50
Semester End Examination	50

Continuous Internal Assessment	% Distribution
3 Quizzes	30 % (3 × 10%)
Assignment (s)	10
Seminar before a committee	10

Assessment Components	CO1	CO2	CO3	CO4	CO5
Continuous Internal Assessment					
Semester End Examination					

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Course Delivery methods

CD	Course Delivery methods
CD1	Lecture by use of boards/LCD Projector
CD2	Assignments
CD3	Seminars
CD4	Laboratory experiments/teaching aids
CD5	Self- learning such as use of NPTEL materials and internets/ Exposure to outside world

M. K. Laha
(M. K. Laha)

Mohan Varma

Mohan Varma.
06.1.20

[Signature]

[Signature]

[Signature]

Rajiv
(Rajiv Kumar)

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	-	2	-	1	2
CO2	3	-	3	-	3	2
CO3	3	-	3	-	1	3
CO4	3	-	2	-	1	3
CO5	3	-	3	-	3	3

If satisfying, $< 34\% = 1$, $34-66\% = 2$, $> 66\% = 3$

Mapping Between COs and Course Delivery (CD) methods

Course Outcome	Course Delivery Method
CO1	CD1, CD2, CD3, CD5
CO2	CD1, CD3, CD5
CO3	CD1, CD5
CO4	CD1, CD2, CD4, CD5
CO5	CD1, CD4, CD5

M. K. Laha
(M. K. Laha)

Mohan Varma
06.1.20

Rajiv Kumar
(Rajiv Kumar)

BIRLA INSTITUTE OF TECHNOLOGY
MESRA : RANCHI

DEPARTMENT OF SPACE ENGINEERING & ROCKETRY

Ref.: RKT/160/2019-20/ 04

January 06, 2020

Minutes of the Meeting of Board of Studies

A Meeting of Board of Studies of the Department was held on Jan. 06, 2020 at 3.00 PM in the office of the Head of the Department to discuss the agenda items given to the members.

The members of BoS reviewed the existing courses of the Department wherein proposal was sought for any minor revision in the courses. The Board members opined unanimously that as the presently offered courses are introduced in July 2018, these may be continued at least two more years. Any minor/major modifications may be done based on the feedback of the students and faculty members after offering the course for at least two batches.

The Board also recommended that two new courses which were placed by the Department for approval i.e. SR 510; Fundamentals of Fuels and Combustion and SR 511: Fundamentals of Aerospace Engineering (Annexure - 1 & 2) were modified and approved by BoS.



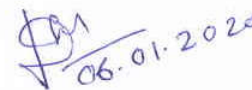
(Prof. M. K. Laha)



(Mr. P. Pathak)



(Prof. Gautam Sarkhel)



(Prof. D. P. Mishra)



(Prof. Sudip Das)



(Dr. Priyank Kumar)



(Dr. Rajiv Kumar)



(Prof. Mohan Varma)

BIRLA INSTITUTE OF TECHNOLOGY
MESRA : RANCHI

DEPARTMENT OF SPACE ENGINEERING & ROCKETRY

Ref.: RKT/160/2019-20/03

Jan. 06, 2020

Attendance of the Members of Board of Studies (BoS) during Meeting
(Jan. 06, 2020)

Internal Member			
Sl. No.	Name	Designation	Signature
1	HOD/In-Charge	Chairman (Ex-Officio)	Mohan Varma
2	Dr. Mohan Varma	Professor	Mohan Varma
3	Dr. Sudip Das	Professor	Pre-occupied
4	Dr. Priyank Kumar	Asst. Professor	Priyank
5	Dr. Rajiv Kumar	Asst. Professor	Rajiv
6	Dr. D. P. Mishra	Professor	D.P. Mishra
7	Dr. Gautam Sarkhel	Professor	Gautam Sarkhel 6/1/2020
External Member			
Sl. No.	Name of Member, Designation, Institute/Company, Full Address	Signature	
1	Dr. M. K. Laha, Assoc. Professor, Deptt. of Aerospace Engg. IIT, Kharagpur	M. K. Laha	
2	Shri P. Pathak, GM, R&D Centre of Steel Authority of India Ltd. Shyamli Colony, Doranda, Ranchi - 834002	P. Pathak 6/1/2020	

BIRLA INSTITUTE OF TECHNOLOGY
MESRA : RANCHI

DEPARTMENT OF SPACE ENGINEERING & ROCKETRY

Ref.: RKT/160/2019-20/02

Jan. 03, 2020

AGENDA ITEMS FOR BOARD OF STUDIES (BoS) MEETING
(JAN. 06, 2020)

1. Approval of New Courses
2. Review of Existing Courses

Mohan Varma
(Dr. Mohan Varma)
Professor & Head and
Chairman, BoS

To: All Members of the BoS



HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

BoS Meeting

1 message

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in> Thu, Jan 2, 2020 at 12:53 PM
To: Sudip Das <sudipas@bitmesra.ac.in>, Priyank Kumar <priyankkumar@bitmesra.ac.in>, rajiv kumar <rajiv@bitmesra.ac.in>, partho mondal <pmondal@bitmesra.ac.in>, shelly biswas <shellybiswas@bitmesra.ac.in>, Swarup Jejurkar <swarup@bitmesra.ac.in>, Mohan Varma <mohanvarma@bitmesra.ac.in>

Dear Colleagues,

A meeting of the Board of Studies of the Department is scheduled to be held on **January 06, 2020 (Monday) at 3 P.M.**

Any relevant matter that you may suggest to be discussed and approved by BoS must be submitted to the office of the HoD before January 03, 2020, 3.00 P.M.

Thanking you,

Dr. Mohan Varma
Professor and Head
Deptt. of Space Engg. & Rocketry
Birla Institute of Technology, Mesra
Ranchi, Jharkhand-835215



HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

BoS Meeting

2 messages

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

Tue, Dec 24, 2019 at 5:35 PM

To: Dean Academic Programme <dean.ap@bitmesra.ac.in>

Cc: Vice Chancellor <vc@bitmesra.ac.in>, "IQAC (Director)" <dir.iqac@bitmesra.ac.in>, Sudip Das <sudipdas@bitmesra.ac.in>

Madam,

This has reference to the meeting of HoDs called by you on Dec. 20, 2019 at 11.00 AM, advising to call BoS Meeting by Jan. 05, 2020 and our telecon this morning.

As desired, we have scheduled the BoS Meeting of our Department on Jan. 06, 2020 for deliberations and approval of some new open electives proposed by us along with revised syllabus of courses already offered by us.

Further, it was earlier informed by the HoD that all course syllabus under CBCS curriculum approved by the BoS earlier and made effective from July 2018 has to be revised to an extent of 15-20% every year. Accordingly, the faculty members have changed the content in their courses. In today's meeting, the Vice Chancellor, however, opined that the yearly change may have operational problems.

Your advice on the following is earnestly solicited to finalize the agenda of BoS Meeting:

1. We have planned to place the 15-20% revised syllabus of subjects before BoS for approval and offer the same starting next semester (SP-2020). These changes had been proposed by faculty members as a matter of requirement and student feedback, mapping criteria or outcome related parameters are not considered for this revision. Please confirm that this is in order and we should go ahead for BoS approval.

2. In this case, the course number may need to be modified to reflect the change in the content. Please suggest the approach for numbering revised syllabus or any other way that may suffice.

Thanking you,

Yours sincerely,

Dr. Mohan Varma
Professor and Head
Deptt. of Space Engg. & Rocketry
Birla Institute of Technology, Mesra
Ranchi, Jharkhand-835215

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

Thu, Jan 2, 2020 at 12:38 PM

To: Dean Academic Programme <dean.ap@bitmesra.ac.in>

Cc: Vice Chancellor <vc@bitmesra.ac.in>, "IQAC (Director)" <dir.iqac@bitmesra.ac.in>

Madam,

I await your kind response on the trail mail dated Dec 24, 2019.

Kindly clarify so that the agenda of BoS Meeting to be held on January 06, 2020 may be finalized.

Thanking you,
Mohan Varma

[Quoted text hidden]



HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

BoS Meeting - Jan. 06, 2020

5 messages

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>
To: mlaha@aero.iitkgp.ac.in

Tue, Dec 24, 2019 at 4:37 PM

Dear Dr. Laha,

The meeting of the Board of Studies of the Department is scheduled to be held on **January 06, 2020 (Monday) at 3.00 PM** in the office of the Head of the Department.

Your consent for the same is greatly appreciated.

Kindly make it convenient to attend.

Thanking you and with regards,

—
Dr. Mohan Varma
Professor and Head
Deptt. of Space Engineering and Rocketry
Birla Institute of Technology, Mesra
Ranchi, Jharkhand-835215

Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
Reply-To: Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
To: HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

Thu, Dec 26, 2019 at 11:47 PM

Dear Professor Mohan Varma,

As I have informed you, I shall be available in your Department during all working hours on 06.01.2020. So if the meeting is held at 3 p.m. then that is alright with me.

Regards & best wishes for the new year.

- M.K. Laha

----- Original Message -----

From: HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>
To: mlaha@aero.iitkgp.ac.in
Sent: Tue, 24 Dec 2019 16:37:44 +0530 (IST)
Subject: BoS Meeting - Jan. 06, 2020

Dear Dr. Laha,

The meeting of the Board of Studies of the Department is scheduled to be held on *January 06, 2020 (Monday) at 3.00 PM *in the office of the Head
[Quoted text hidden]

Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
Reply-To: Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
To: HOD Engineering <hod.ser@bitmesra.ac.in>

Fri, Jan 3, 2020 at 11:22 AM

Dear Prof. Mohan Verma,

This is to request you to arrange for my transport from Ranchi railway station to your Institute on 05th

January. My train (18627 Howrah Ranchi intercity express) is scheduled to arrive at 10:15 p.m.
Please also provide me the name and phone number of the driver of the pickup vehicle and oblige.
Thanks and regards.
- M.K. Laha
IIT Kharagpur
[Quoted text hidden]

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>
To: Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>

Fri, Jan 3, 2020 at 6:44 PM

Dear Prof. Laha,

I have made necessary arrangements for your visit. I will message you the number of driver who will come to pick you up on Sunday, as the duty will be assigned on the same day.

Looking forward to meeting you,

Mohan Varma b
[Quoted text hidden]

Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
Reply-To: Manas Kumar Laha <mlaha@aero.iitkgp.ac.in>
To: HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

Fri, Jan 3, 2020 at 8:28 PM

Thanks very much, Prof. Varma.
[Quoted text hidden]



HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>

BoS Meeting - Jan. 06, 2020

1 message

HOD Space Engineering & Rocketry <hod.ser@bitmesra.ac.in>
To: ppathak@sail-rcdis.com

Tue, Dec 24, 2019 at 4:42 PM

Dear Mr. Pathak,

The meeting of the Board of Studies of the Department is scheduled to be held on **January 06, 2020 (Monday) at 3.00 PM** in the office of the Head of the Department.

Your consent for the same is greatly appreciated.

Kindly make it convenient to attend.

Thanking you and with regards,

--
Dr. Mohan Varma
Professor and Head
Deptt. of Space Engineering and Rocketry
Birla Institute of Technology, Mesra
Ranchi, Jharkhand-835215

Annexure - XIV



BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI

Ref.: Dean (AP)/2020-21/24

Date: 24/09/2020

Addendum to the Assessment & Adjustments Policy for Examinations (MO 20) – COVID 19

With reference to the guidelines for Assessment & Adjustments Policy for Examinations (MO 20) – COVID 19, issued vide ref. no. Dean (AP)/2020-21/18 dated 09/09/2020, the guidelines for Assessment & Adjustments Policy for Examinations (MO 20) – COVID 19 (**Clause 2.1**) for the B.Pharm & M.Pharm students shall be as under:

Progressive Evaluation

Progressive Evaluation (PE) shall be of 25 marks for B.Pharm. & M.Pharm Programme under PCI regulations and 40 marks for B.Pharm. & M.Pharm Programme under Non-CBCS (as per UG / PG Regulations 2011). Assessment shall be done at the completion of each module in the course. Assessment pattern shall follow the guidelines set in the Institute policy referred above.

(Dr. Padmini Padmanabhan)
Dean (Academic Programme)

Copy to:

1. Deans/CoE/Director-IQAC/Registrar
2. HoD- Pharm. Sciences & Tech.
3. Prof. Incharge –ERP
4. PS to Vice Chancellor
5. File