



# Program Booklet

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Department of CSE, BIT Mesra



## **Department of Computer Science & Engineering** **Birla Institute of Technology, Mesra, Ranchi - 835215 (India)**

### **Master of Computer Application**

#### **Institute Vision**

To become a Globally Recognized Academic Institution in consonance with the social, economic and ecological environment, striving continuously for excellence in education, research and technological service to the National needs.

#### **Institute Mission**

To educate students at Undergraduate, Postgraduate, Doctoral, and Post-Doctoral levels to perform challenging engineering and managerial jobs in industry.

- To provide excellent research and development facilities to take up Ph.D. programmes and research projects.
- To develop effective teaching and learning skills and state of art research potential of the faculty.
- To build national capabilities in technology, education and research in emerging areas.
- To provide excellent technological services to satisfy the requirements of the industry and overall academic needs of society.

#### **Department Vision**

The department strives to be recognized globally for outstanding education and research, leading to excellent professionals and innovators in the field of Computer Science and Engineering, who can positively contribute to the society.

#### **Department Mission**

1. To impart quality education and equip the students with strong foundation that could make them capable of handling challenges of the new century.

2. To maintain state of the art research facilities and facilitate interaction with world's leading universities, industries and research organization for constant improvement in the quality of education and research.

### **Programme Educational Objectives (PEOs) –Master of Computer Application**

**PEO 1:** To excel in software development skills coveted in the IT industry.

**PEO 2:** To be well prepared for pursuing higher studies in related fields of teaching and research.

**PEO 3:** To be aware of the requirements of being an ethical and professional leader and inculcating team spirit.

**PEO 4:** To inculcate the ability to innovate and contribute towards the growth of the nation.

### **Graduate Attributes (GAs)**

#### **GA1: Scholarship of Knowledge**

Acquire in-depth knowledge of specific discipline or professional area, including wider and global perspective, with an ability to discriminate, evaluate, analyse and synthesise existing and new knowledge, and integration of the same for enhancement of knowledge.

#### **GA2: Critical Thinking**

Analyse complex engineering problems critically, apply independent judgement for synthesising information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

#### **GA3: Problem Solving**

Think laterally and originally, conceptualise and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.

#### **GA4: Research Skill**

Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyse and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.

### **GA5: Usage of modern tools**

Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations.

### **GA6: Collaborative and Multidisciplinary work**

Possess knowledge and understanding of group dynamics, recognise opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.

### **GA7: Project Management and Finance**

Demonstrate knowledge and understanding of engineering and management principles and apply the same to one 's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

### **GA8: Communication**

Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.

### **GA9: Life-long Learning**

Recognise the need for and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

### **GA10: Ethical Practices and Social Responsibility**

Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

### **GA11: Independent and Reflective Learning**

Observe and examine critically the outcomes of one 's actions and make corrective measures subsequently and learn from mistakes without depending on external feedback.

## **PROGRAM OUTCOMES (POs) for MCA(MASTER OF COMPUTER APPLICATION)**

**PO 1:** Attain problem solving attitude in systematic and timely manner.

**PO 2:** Apply knowledge of mathematics, algorithm and computing principles appropriately to solve real-world problems.

**PO 3:** Identify modern tools and techniques through critical thinking for solving complex problems.

**PO 4:** Use the computational resources efficiently to develop software for the industry need.

**PO 5:** Understand and assess societal, environmental, safety, legal and ethical norms for professional computing practices.

**PO 6:** Function as an individual or as a member in team in the software domain.

**PO 7:** Recognize the need for self-motivation, learning and unlearning to engage in life-long learning for continual development.

**PO 8:** Excel in descriptive oral, written communication and presentation skills required for documenting and delivering project artefacts effectively.

**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)	
<b>Theory</b>								
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
<b>Laboratories</b>								
	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
		<b>Total</b>						

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/ week)	T (periods/ week)	P (periods/ week)	
<b>Theory</b>								
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								
	<b>FOURTH</b>	Programme Core (PC)	CA414	DCCN Lab	0	0	3	1.5
	<b>FOURTH</b>	Programme Core (PC)	CA416	Software Engineering Lab	0	0	3	1.5
	<b>FOURTH</b>	Programme Core (PC)	CA422	IT Tools & Techniques Lab	0	0	3	1.5
<b>Total</b>								<b>22.5</b>

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/week)	T (periods/week)	P (periods/week)	
<b>Theory</b>								
<b>Third/ Monsoon</b>	<b>FIFTH</b>	Programme Core (PC)	CA511	Basics of Machine Learning	3	0	0	3
	<b>FIFTH</b>	Programme Core(PC)	CA513	Compiler Design	3	1	0	4
	<b>FIFTH</b>	Programme Core (PC)	CA515	Soft Computing	3	0	0	3
	<b>FIFTH</b>	SIT / Soft Skill Course / Extra OE	CA550	Small Industrial Training/ Small Project/MOOC				6
	<b>FIFTH</b>	Program Elective	-	Program Elective - II	3	0	0	3
	<b>FIFTH</b>	Program Elective	-	Program Elective - III	3	0	0	3
<b>Laboratories</b>								
	<b>FIFTH</b>	Programme Core (PC)	CA512	Basics of Machine Learning Lab	0	0	3	1.5
	<b>FIFTH</b>	Programme Core (PC)	CA514	Compiler Design Lab	0	0	3	1.5
<b>Total</b>								<b>25</b>

Semester	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits			Total Credits
					L (periods/week)	T (periods/week)	P (periods/week)	
<b>Project</b>								
<b>Fourth/ Spring</b>	<b>FIFTH</b>	Project	CA590	Project				20
<b>Total</b>								<b>20</b>

**Total Credits: 90**

**List of Program Electives**

<b>PE/ LEVEL</b>		<b>Course Code</b>	<b>Name of the PE courses</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
4	<b>PE1</b>	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	<b>PE2</b>	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	<b>PE3</b>	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 LanguageProcessing	3	0	0	3
5		CA547	Big Data Analytics	3	0	0	3
5		CA549	Block Chain Technology	3	0	0	3