Indian Institute of Technology Jodhpur

Course Booklet

for

M.Tech. (CSE)

and

Dual degree M.Tech. (CSE) + PhD

Programs

offered by the

Department of Computer Science and Engineering

July 2019

**M.Tech and M.Tech-Ph.D dual degree programs
in Computer Science and Engineering**

Introduction:

Traditionally Computer Science and Engineering (CSE) teaching were focusing on two major areas, i.e., theories and systems (database, computer hardware, and operating systems). With the advent of the era of Cloud Computing, Edge Computing, AI and Big Data, the discipline is being transformed by incorporation of new emerging technologies. It is becoming an instrumental tool in solving major problems faced by modern society such as energy, natural disasters, pollution, and water. Through this newly revamped M.Tech and M.Tech-Ph.D dual degree programs in CSE, IIT Jodhpur is making a conscious effort to divulge from the traditional path and planning to reposition itself to become a leading institute in this new genre of Computer Science education.

Objectives:

This M.Tech and M.Tech-Ph.D dual degree programs in CSE will offer students with deep knowledge of core and applied computer science. Through this programme, a student will learn niche subject areas which are of paramount importance in the modern big data era, such as Computer Systems and Security. This programme is aiming at imparting the necessary breadth and depth to the students for pursuing careers in academics as well as in industry. This programme is aiming at extending undergraduate computing skills with up-to-date and in-depth expertise in specialized areas of Computer Systems and Security.

Expected Graduate Attributes:

After completing this programme, a student will be able to develop an ability to:

1. Understand fundamental concepts and hands-on knowledge of emerging fields in Computer Science.
2. Conceive, Design and Develop state-of-the-art scalable parallel and distributed systems
3. Solve Big data problems through the knowledge of advanced data structures, distributed algorithmic design, analysis, and applications.
4. Design and develop network protocols for Wireless, Sensor, Mobile, and Vehicular networks.
5. Ideate, Implement and Integrate cryptographic, fault tolerant algorithms for large scale distributed systems
6. Understand state-of-the-art hardware platforms for running compute intensive distributed algorithms
7. Ability to understand and apply evolving ethics and privacy laws across various domains and territories.
8. Plan and manage technical projects

Learning Outcome:

1. Understand the fundamentals of algorithmic complexity, advanced computer architecture, advanced network, and security protocols.
2. Apply appropriate design principles, framework and protocols to develop dependable systems.
3. Demonstrate hands-on knowledge of cutting edge simulation, synthesizing, programming tools.
4. Ability to design and develop system architecture for mobile, cloud, fog, and edge computing.
5. Demonstrate hands-on knowledge of virtualization, data center design and management, and software defined networking.
6. Skills to comprehend and communicate effectively.
7. Apply appropriate project and business management principles and tools for real-world problems.

Course Structure for the
M.Tech. (CSE) Program and
Dual Degree M.Tech. (CSE)+Ph.D. Program

Cat	Code	Course Title	L-T-P	Cr	Cat	Code	Course Title	L-T-P	Cr
I Semester					**II Semester**				
C	MAL7xx0	Statistics I Matrix Computation Optimization	1-0-0 1-0-0 1-0-0	3	C	CSL7xx0	Computer Architecture	3-0-0	3
C	CSL7xx0	Algorithms for Big Data	2-0-0	2	C	CSL7xx0	Software and Data Engineering	3-0-0	3
C	CSL7xx0	Machine Learning I	3-0-0	3	C	CSL7xx0	Security and its applications	3-0-0	3
C	CSP7xx0	Data Structures and Practices	0-0-2	1	PE	xxxxx	Program Elective 3	3-0-0	3
PE	xxxxx	Program Elective 1	3-0-0	3	OE	xxxxx	Open Elective 1	3-0-0	3
PE	xxxxx	Program Elective 2	3-0-0	3	NG	xxxxx	Ethics and Professional Life	1-0-0	1
NG		Technical Communication	1-0-0	1					
			Total Credits: 16					Total Credits: 16	

*Maths Fractals: Linear Algebra, Probability and Random Processes, Optimization

Cat	Code	Course Title	L-T-P	Cr	Cat	Code	Course Title	L-T-P	Cr
III Semester					**IV Semester**				
P	CSD7xx0	Major Project – Part 1	0-0-10	5	P	CSD8xx0	Major Project – Part 2	0-0-22	11
PE	xxxxx	Program Elective 4	3-0-0	3	PE	xxxxx	Program Elective 6	3-0-0	3
PE	xxxxx	Program Elective 5	3-0-0	3	NG	xxxxx	Intellectual Property	1-0-0	1
OE	xxxxx	Open Elective - 2	3-0-0	3					
NG	xxxxx	System Design	1-0-0	1					
			Total Credits: 15					Total Credits: 15	

	Credit Distribution	
1	Program Core	18 credits
2	Program Electives	18 credits
3	Open Electives	6 credits
4	Project	16 credits
5	Non-graded	4 credits
	Total	62 credits