

Specializations in M.Tech. Software Systems

Key Points: Specializations in M.Tech. Software Systems

1. Specializations are optional. The offering of any specialization or elective is subject to viability.
2. You may choose electives for a specialization among the elective courses offered. Based on completion of requirements for specialization, the specialization will be awarded.
3. The specialization, if any, will be mentioned only at the end of the Transcript, but not on the Provisional Certificate or Degree Certificate.
4. **We will ask you in the last semester of your degree programme that you want to opt the specialization or not, based on your consent it will be awarded and mentioned on the Transcript.**
5. Please note that, in case you decide to not opt for any specialization, then you may choose any electives from general pool or across the specializations.
6. Please make a note that based on your selection of courses in 3 semesters, eligibility for a particular specialization will be decided.
7. **In case of you are eligible for more than one specialization, you can opt only one.**
8. Please ensure that total no. of units for course work should be minimum 48.

Classification: There are five types of Specialization in M.Tech. Software Systems.

Requirement For Specialization				
Specialization	Total Elective	Specialization Required complete	To Mandatory Course	Elective Min.Unit
Network and Cloud	12	5	2	19
Security	10	5	1	18
Internet of Things	8	5	2	20
Data Analytics	9	5	1	18
Embedded Systems	9	5	1	20

Requirements for a Specialization:

1. Minimum 5 electives are to be chosen from the designated pool of electives for that specialization. The remaining three electives may be chosen from the same specialization, general pool of electives or across the specializations.
2. Only four courses can be taken in each semester, with one course in each examination session. For registration in each semester, a student must choose only one course from each course group corresponding to one session.
3. Please note that the offering of any specialization or elective is subject to viability. Some specializations or some electives within electives may not be offered.
4. Please check the course description and M.Tech. Software Systems brochure through the link appended below:

- [Course Description for the M.Tech. Software System](#)
- [M.Tech. Software Systems Brochure](#)

Please choose the elective courses carefully. The option chosen by you and the courses selected by you would be treated as final and the choice of specialization (or non-specialization) or electives cannot be changed later.

M.Tech. Software Systems Curriculum:

Core Courses

Course No.	Course Title	Units
SS* ZG519	Data Structures & Algorithms Design *	5
SS* ZG518	Database Design & Applications *	5
SS* ZG526	Distributed Computing	5
SS* ZG653	Software Architectures	5

General Pool of Electives

Course No.	Course Title	Units
SS* ZC444	Artificial Intelligence	3
SS* ZG514	Object Oriented Analysis & Design	4
SS* ZG516	Computer Organization and Software Systems	5
SS* ZG547	Usability Engineering	5
SS* ZG554	Distributed Data Systems	5
SS* ZG562	Software Engineering and Management	5

Specialization for M.Tech. Software Systems

Pool of courses for Specialization 1: Networks and Cloud

Course No.	Course Title	Units
SS* ZC446	Data Storage Technologies and Networks	3
SS* ZC462	Network Programming	3
SS* ZC467	Computer Networks #	4
SS* ZG513	Network Security	4
SS* ZG520	Wireless and Mobile Communication	5
SS* ZG522	Design and Operation of Data Centres	5
SS* ZG525	Advanced Computer Networks	5
SS* ZG527	Cloud Computing #	5
SS* ZG578	Mobile Networks	4
SS* ZG580	Software Defined Networks	5
SS* ZG586	Edge Computing	5
SS* ZG589	Middleware Technologies	4

Requirements:

- 5 courses / 19 units (min) are to be chosen from the designated pool of courses for this specialization.
- # indicates mandatory course for this specialization. Other courses form the pool of electives.

Pool of courses for Specialization 2: Security

Course No.	Course Title	Units
SS* ZC463	Cryptography	3
SS* ZG513	Network Security	4
SS* ZG566	Secure Software Engineering	5
SS* ZG567	AI and ML Techniques in Cyber Security	5
SS* ZG569	Blockchain Technologies & Systems	4
SS* ZG570	Cloud, IoT and Enterprise Security	5
SS* ZG588	Cyber Crimes, Forensics and Incident Handling	4
SS* ZG575	Ethical Hacking	3
SS* ZG576	Identity and Access Management Technologies	4
SS* ZG681	Cyber Security#	4

Requirements:

- 5 courses / 18 units (min) are to be chosen from the designated pool of courses for this specialization.
- # indicates mandatory course for this specialization. Other courses form the pool of electives.

Pool of courses for Specialization 3: Internet of Things

Course No.	Course Title	Units
SS* ZG512	Embedded Systems Design#	4
SS* ZG527	Cloud Computing	5
SS* ZG528	Cyber Physical Systems#	4
SS* ZG556	Stream Processing and Analytics	5
SS* ZG584	Data Management for IoT	5
SS* ZG574	Embedded Network Security	4
SS* ZG585	Cross Platform Application Development	4
SS* ZG656	Networked Embedded Applications	4

Requirements:

- 5 courses / 20 units (min) are to be chosen from the designated pool of courses for this specialization.
- # indicates mandatory course for this specialization. Other courses form the pool of electives.

Pool of courses for Specialization 4: Data Analytics

Course No.	Course Title	Units
SS* ZC416	Mathematical Foundations for Data Science #	4
SS* ZC425	Data Mining	3
SS* ZG515	Data Warehousing	5
SS* ZG529	Deep Learning	4
SS* ZG530	Natural Language Processing	3
SS* ZG536	Advanced Statistical Techniques for Analytics	4
SS* ZG537	Information Retrieval	4
SS* ZG568	Applied Machine Learning	4
SS* ZG577	Metaheuristics for Optimization	4

Requirements:

- 5 courses / 18 units (min) are to be chosen from the designated pool of courses for this specialization.
- # indicates mandatory course for this specialization. Other courses form the pool of electives.

Pool of courses for Specialization 5: Embedded Systems

Course No.	Course Title	Units
SS* ZC427	Software for Embedded Systems	4
SS* ZG512	Embedded System Design #	4
SS* ZG553	Real Time Systems	5
SS* ZG579	Real Time Scheduling	4
SS* ZG626	Hardware Software Co-Design	5
SS* ZG656	Networked Embedded Applications	4
SS* ZG682	Embedded Middleware Design	5
SS* ZG683	Fault Tolerant Embedded System	4
SS* ZG684	Parallel Embedded Architectures	4

Requirements:

- 5 courses / 20 units (min) are to be chosen from the designated pool of courses for this specialization.
- # indicates mandatory course for this specialization. Other courses form the pool of electives.

Semesterwise pattern of courses

Year	Semester I		U	Semester II		U
I	SS* ZG519	Data Structures & Algorithms Design	5	SS* ZG653	Software Architectures	5
	SS* ZG518	Database Design & Applications	5	Elective 2		3(min)
	SS* ZG526	Distributed Computing	5	Elective 3		3(min)
	Elective 1		3(min)	Elective 4		4(min)
	Total		18(min)	Total		15 (min)
II	Elective 5		3(min)	SS* ZG628T	Dissertation	16
	Elective 6		3(min)			
	Elective 7		4(min)			
	Elective 8		4(min)			
	Total		14(min)	Total		16