



**SGT UNIVERSITY**

**SHREE GURU GOBIND SINGH TRICENTENARY UNIVERSITY**  
(UGC Approved)

Gurugram, Delhi-NCR

Budhera, Gurugram-Badli Road, Gurugram (Haryana) – 122505 Ph. : 0124-2278183, 2278184, 2278185

# Faculty of Engineering and Technology

Master of technology(CSE)

Syllabus

2019



## Scheme of Examination for M.Tech–Computer Science & Engineering Program

### First Semester

S. NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Ext.	Int.	
1	13070101	Computer system software	4	0	0	4	60	40	100
2	13070102	Mathematical foundation of Computer Science	4	0	0	4	60	40	100
3	13070103	Analysis & Design of Algorithms	4	0	0	4	60	40	100
4	13070104	Internet & Web Technology	4	0	0	4	60	40	100
5	13070105	Internet Lab	0	0	4	2	40	60	100
6	13070106	CSS lab	0	0	4	2	40	60	100
7	13070107	Seminar	0	0	2	1		50	50
		<b>Total</b>	<b>16</b>	<b>0</b>	<b>10</b>	<b>19</b>	<b>320</b>	<b>330</b>	<b>650</b>

### Second Semester

S. NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Ext.	Int.	
1	13070201	Soft Computing	4	0	0	4	60	40	100
2	13070202	Resource Management in Computer System	4	0	0	4	60	40	100
3	13070203	Mobile & Wireless Communication	4	0	0	4	60	40	100
4		Program Elective – I	4	0	0	4	60	40	100
5	13070206	Operating System Lab	0	0	4	2	40	60	100
6	13070207	Soft Computing Lab	0	0	4	2	40	60	100
7	13070208	Seminar	0	0	2	1		50	50
		<b>Total</b>	<b>16</b>	<b>0</b>	<b>10</b>	<b>19</b>	<b>320</b>	<b>330</b>	<b>650</b>



## Scheme of Examination for M.Tech–Computer Science & Engineering Program

### Third Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Ext.	Int.	
1	13070301	Knowledge based System Design	4	0	0	4	60	40	100
2	13070302	Advanced DBMS	4	0	0	4	60	40	100
3	13070303	System & Network Administration	4	0	0	4	60	40	100
4		Program Elective – II	4	0	0	4	60	40	100
5	13070306	AI Lab	0	0	4	2	40	60	100
6	13070307	Minor Project	0	0	4	2	40	60	100
7	13070308	Seminar	0	0	2	1		50	50
		<b>Total</b>	<b>16</b>	<b>0</b>	<b>10</b>	<b>19</b>	<b>320</b>	<b>230</b>	<b>650</b>

### Fourth Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Ext.	Int.	
1	13070401	Dissertation & Viva	0	0	20w	10	180	120	300
		<b>Total</b>	<b>0</b>	<b>0</b>	<b>20w</b>	<b>10</b>	<b>180</b>	<b>120</b>	<b>200</b>

## List of Program Electives

	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Ext.	Int .	
Elective I									
1	13070204	Software Verification Validation & Testing	4	0	0	4	60	40	100
2	13070205	Advanced Microprocessors	4	0	0	4	60	40	100
Elective II									
1	13070304	Software Project Management	4	0	0	4	60	40	100
2	13070305	Information & Security Management	4	0	0	4	60	40	100
		(Students to opt for any 2 subjects as per scheme)							

**Total credits: 67 credits**

**M.Tech CSE 3<sup>rd</sup> Semester**  
**Knowledge Based System Design**

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2.Course Name</b>	<b>Knowledge Based System Design</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>3</b>	<b>0</b>	<b>0</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>	<b>OE ()</b>		
<b>5. Pre-requisite (if any)</b>	Programming Language	<b>Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>6. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 36</b>		<b>Tutorials = 0</b>	<b>Practical = 0</b>			
<b>7. Course Description</b>						
The aim of this course is to motivate the students to know about Knowledge representations and mappings, approaches and issues (e.g. predicate logic, fuzzy logic, weak and strong slot and filler structures), knowledge acquisition, the frame problem, symbolic reasoning under uncertainty (non monotonic reasoning, augmenting a problem Solver), statistical reasoning (e.g.probability and Bays Theorem,Bayesian networks ),building knowledge-based systems.						
<b>8. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>• Be able to understand the knowledge-based systems representation.</li> <li>• Be able to understand automatic reasoning.</li> <li>• Be able to understand inductive and deductive learning.</li> <li>• Be able to implement a small knowledge- based system.</li> </ul>						
<b>9. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• The students will design an expert system using appropriate knowledge-based software tools.</li> </ul>						
<ul style="list-style-type: none"> <li>• To enable students to design a knowledge structure integrated with production planning, quality control and other subsystems of an industrial organization.</li> </ul>						
<ul style="list-style-type: none"> <li>• To introduce the features of a feasible expert system.</li> </ul>						
<ul style="list-style-type: none"> <li>• Apply AI techniques to the problem of acquisition and representation of expert knowledge for problem solving in the expert's domain</li> </ul>						
<b>10. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 10</b>	Introduction to Knowledge Based Systems and Knowledge Based System Architecture				
Introduction to Knowledge Based Systems – Objectives of KBS , Components, Categories, Difficulties with the KBS.						
Knowledge Based System Architecture – Source of Knowledge , Types of Knowledge, Basic Structure, Knowledge Bases, Inference Engine, Self Learning, Reasoning, Explanation, Applications. Limitations of Knowledge Based Systems.						
<b>Unit – 2</b>	<b>Number of lectures = 08</b>	<b>Developing Knowledge Based Systems</b>				
Developing Knowledge Based Systems – Knowledge Based System development Model, Knowledge Acquisition, Techniques for Knowledge Acquisition, Sharing Knowledge, Updating Knowledge.						
<b>Unit – 3</b>	<b>Number of lectures = 10</b>	<b>Knowledge Representation and Reasoning &amp; Knowledge Management</b>				
Knowledge Representation and Reasoning – The propositional calculus and Resolution, Predicate calculus and Resolution, Representing Procedural Knowledge, Reasoning with Uncertain Information, Learning and Acting with Bayes Nets.						
Knowledge Management - Introduction, Perspectives, Evolution, Elements of Knowledge Management, Knowledge						

Management Process, Tools and Technologies, Knowledge Management Roles and Responsibilities, Knowledge Management Models.		
Unit – 4	Number of lectures = 08	Agent Based Systems
Agent Based Systems – Characteristics, Types of Agents, Agent Communication Language, Multi Agent Systems.		
<b>11. Brief Description of self-learning / E-learning component</b> The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. <a href="https://elearning.sgtuniversity.ac.in/course-category/">https://elearning.sgtuniversity.ac.in/course-category/</a>		
<b>12. Books Recommended</b>		
<b>Text Books</b>		
<ul style="list-style-type: none"> <li>Rajendra Akerkar, PritiSajja, “Knowledge-Based Systems”, Jones &amp; Bartlett Learning, 1 st Ed., 2010.</li> </ul>		
<b>Reference Books</b>		
<ul style="list-style-type: none"> <li>Nils J Nilsson “Artificial Intelligence – A New Synthesis”, Morgan Kaufman Publishers 1 st Ed., 2003.</li> </ul>		
<ul style="list-style-type: none"> <li>Cornelius T Leondes, “Knowledge-Based Systems: Techniques and Applications”, Academic Press, 1st Ed., 2000.</li> </ul>		
<ul style="list-style-type: none"> <li>Elias M Awad, Hassan M Ghaziri, “Knowledge Management”, Pearson Education, 1st Ed., 2007.</li> </ul>		

## Advanced Database Management System

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>Advanced Database Management System</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>3</b>	<b>0</b>	<b>0</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>6. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 36</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>		
<b>7. Course Description</b>						
This module aims to give students in depth information about system implementation techniques, data storage, representing data elements, database system architecture, the system catalog, query processing and optimization, transaction processing concepts, concurrency control techniques, database recovery techniques.						
<b>8. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>To understand the basic concepts and terminology related to DBMS and Relational Database Design</li> <li>To design and implement Distributed Databases.</li> <li>Do query evaluation and query optimization</li> </ul>						
<b>9. Course Outcomes (COs):</b>						
<p>Upon the completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> <li>Describe basic database concepts, Data Models, Schemas, Instances, and Components in the DBMS architecture.</li> <li>Evaluate simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer</li> <li>Demonstrate the issues involved in data integration for distributed query processing</li> <li>Implement transactions, concurrency control and be able to do Database recovery and Query optimization</li> </ul>						
<b>10. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 9</b>					
Data Base Fundamentals, SQL Queries, Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF – Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition						
<b>Unit – 2</b>	<b>Number of lectures = 09</b>					
Transaction Management: Transactions and the ACID Properties of Transactions, Schedules, Serializability, Concurrent Execution of Transactions – Lock Based Concurrency Control, Time stamp based protocols, Deadlocks. Crash recovery: Introduction to Crash recovery, Recovery techniques-deferred update, immediate update and Check pointing						
<b>Unit – 3</b>	<b>Number of lectures = 9</b>					
Query Optimization-introduction to query processing,stages in query processing, query processing algorithms, query plan execution and cost based query optimizations						
<b>Unit – 4</b>	<b>Number of lectures = 09</b>	<b>Design of experiments &amp; Time series and forecasting</b>				

Parallel database and Distributed databases: Parallel databases, Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing, Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery.

Introduction to data warehouse and Data mining

### **11. Brief Description of self-learning / E-learning component**

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

<https://elearning.sgtuniversity.ac.in/course-category/>

### **12. Books Recommended**

#### **Text Books**

- R. Ramakrishnan, J. Gehrke, Database Management Systems, McGraw Hill, 2004
- A. Silberschatz, H. Korth, S. Sudarshan, Database system concepts, 5/e, McGraw Hill, 2008.

#### **Reference Books**

- Elmasri R, Navathe S B, Somayajulu D V L N, and Gupta S K, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2009.
- C. J. Date, “Introduction to Database Systems”, 8th Edition, Pearson Education



# System Network Administration

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>System Network Administration</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>3</b>	<b>0</b>	<b>0</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>	<b>OE ()</b>		
<b>5. Pre-requisite (if any)</b>		<b>Frequency (use tick marks)</b>	Even ()	Odd (✓)	Either Sem ()	Every Sem ()
<b>6. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 36</b>		<b>Tutorials = 0</b>	<b>Practical = 0</b>			
<b>7. Course Description</b>						
This course aims to give students in depth information about security, host administration and Unix commands						
<b>8. Learning objectives:</b>						
To learn essential systems administration skills related to operating systems, system and network service administration, computer and information security and directory services administration						
<b>9. Course Outcomes (COs):</b>						
Upon the completion of this course, the student will be able to: <ul style="list-style-type: none"> <li>• To Install the Unix operating system, and apply operating system updates, and configuration changes.</li> <li>• To Install and configure new hardware/software</li> <li>• To Manage user accounts</li> <li>• To Perform backups of data</li> <li>• To Assess system security</li> </ul>						
<b>10. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 9</b>					
Network Administration:-system administrator, network administrator, phases of network administration, addresses in TCP/IP model, IP addressing, Sub netting, Supernetting, NAT, VLAN, Routing protocols, Basic Concepts of proxy server, web server, DNS and their respective configuration settings. Various Interconnecting Devices; Hub, Switch, Bridges, Routers, Gateway, repeater, brouter. Commands used in troubleshooting of TCP/IP: ping, netstat, traceroute, ifconfig and route command.						
<b>Unit – 2</b>	<b>Number of lectures = 09</b>					
System Administration: Introduction to system Administration, goals of system administrator, role of network and system administrator, unix operating system, comparison of various operating systems, file system-NFS, UFS and NTFS, System performance tuning						
<b>Unit – 3</b>	<b>Number of lectures = 9</b>					
Host and Network Security: Types of computer security, aspects of security, types of attacks, network security mechanisms, authentication and authorization for remote access, access control and monitoring, Access Control Models ABAC,DAC,MAC,RBAC, firewall, filtering rules, detection and prevention of denial of service attack						
<b>Unit – 4</b>	<b>Number of lectures = 09</b>	<b>Design of experiments &amp; Time series and forecasting</b>				
Host management:-installation of Unix, Linux, windows OS, booting process in various OS, File allocation methods,User accounts, controlling user resources, Unix Commands, Shell scripting, Perl scripting and python scripting						

**11. Brief Description of self-learning / E-learning component**

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

<https://elearning.sgtuniversity.ac.in/course-category/>

**12. Books Recommended****Text Books**

1. The unix programming environment, Brian Kernighan & Rob Pike, Pearson Education India; 1 edition, 2015.

**Reference Books**

1. Design of the Unix operating system, AT&T Bell Labs Maurice J. Bach, Pearson Education India; 1 edition, 2015.
2. Advanced Unix programmer's Guide, Stephen Prato Bpb publisher, 2008.
3. Unix Concepts and applications-Featuring SCO Unix and Linux, Sumitabha Das

# Software Project Management

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>Software Project Management</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>4</b>	<b>0</b>	<b>0</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>	Programming Lang. and Software Engg.	<b>6. Frequency (use tick marks)</b>	Even ()	Odd (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 42</b>		<b>Tutorials = 0</b>	<b>Practical = 0</b>			
<b>8. Course Description</b>						
This course describes the key aspects of a software project. It begins with the job description of a software manager and then addresses those topics germane to successful software development management, including organizing the software development team; interfacing with other engineering organizations, assessing development standards; selecting the best approach and tailoring the process model; estimating software cost and schedule; planning and documenting the plan; staffing the effort; managing software cost and schedule during development; risk engineering; and continuous process improvement.						
<b>9. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>To understand the methods used to evaluate and select projects for investment of funds</li> <li>To gain knowledge on the principles and techniques of software project management</li> <li>To introduce organization behavior and general management techniques used for project management</li> </ul>						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>Apply project management concepts and techniques to an IT project.</li> <li>Identify issues that could lead to IT project success or failure.</li> <li>Explain project management in terms of the software development process.</li> <li>Describe the responsibilities of IT project managers</li> </ul>						
<b>11. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 10</b>	<b>PROJECT CONCEPTS AND ITS MANAGEMENT</b>				
Software Project Categorization, Software VS other projects, Stakeholders, Project Success and Failure, Software project Activities Project life cycle models-ISO 9001 model-Capability Maturity Model-Project Planning-Project tracking-Project closure. Evolution of Software Economics – Software Management Process Framework: Phases, Software Management Planning / Project Organization and Responsibilities						
<b>Unit – 2</b>	<b>Number of lectures = 10</b>	<b>COST ESTIMATION</b>				
Problems in Software Estimation – Algorithmic Cost Estimation Process, Function Points, SLIM (Software Life cycle Management), COCOMO II (Constructive Cost Model) – Estimating Web Application Development – Concepts of Finance, Activity Based Costing and Economic Value Added (EVA) – Balanced Score Card.						
<b>Unit – 3</b>	<b>Number of lectures = 12</b>	<b>SOFTWARE QUALITY MANAGEMENT</b>				
Software Quality Factors – Software Quality Components – Software Quality Plan – Software Quality Metrics – Software Quality Costs – Software Quality Assurance Standard – Certification –						

<b>Assessment. Software Configuration Management – Risk Management: Risk Assessment: Identification / Analysis / Prioritization</b> <b>Risk Control: Planning / Resolution / Monitoring</b> <b>Failure Mode and Effects Analysis (FMEA) ,Defect Management ,Cost Management.</b>		
<b>Unit – 4</b>	<b>Number of lectures = 10</b>	<b>PROJECT EVALUATION AND EMERGING TRENDS</b>
<b>Strategic Assessment–Technical Assessment–Cost Benefit Analysis–Cash Flow Forecasting–Cost Benefit Evaluation Technique–Risk Evaluation–Software Effort Estimation. Emerging Trends: Import of the internet on project Management – people Focused Process Models</b>		
<b>12. Brief Description of self-learning / E-learning component</b> The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. <a href="https://elearning.sgtuniversity.ac.in/course-category/">https://elearning.sgtuniversity.ac.in/course-category/</a>		
<b>13. Books Recommended</b>		
<b>Text Books</b> <ul style="list-style-type: none"> <li>• Bob hughes and Mike Cotterell, “Software Project Management” second edition,1999.</li> <li>• Royce, W. “Software Project Management: A Unified Framework”, AddisonWesley, 1998.</li> </ul>		
<b>Reference Books</b>		
<ul style="list-style-type: none"> <li>• Ramesh Gopalaswamy , “Managing and global Software Projects”, Tata McGraw Hill Tenth Reprint, 2011.</li> </ul>		
<ul style="list-style-type: none"> <li>• Roger S.Pressman, “Software Engineering- A Practitioner’s Approach“, 7th Edition ,McGraw Hill, 2010.</li> </ul>		
<ul style="list-style-type: none"> <li>• Daniel Galin, “Software Quality Assurance: from Theory to Implementation”, Addison-Wesley, 2003.</li> </ul>		
<ul style="list-style-type: none"> <li>• Fenton, N.E., and Pfleeger, S.L.. “Software Metrics: A Rigorous and Practical Approach, Revised” Brooks Cole, 1998.</li> </ul>		
<ul style="list-style-type: none"> <li>• Demarco, T. and Lister, T. “Peopleware: Productive Projects and Teams, 2nd Ed.”, Dorset House,1999.</li> </ul>		