Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Third Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional MSE	Max. Marks Sessional IE	Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
BSC/ESC /HSMC	SE101CS	S&H	Applied Mathematics-III (Differential Calculus)	3	0	0	2	3	80	10	10	100	40	-	-	-	-
PCC	SE102CS	Computer	Data structure & Algorithms	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	SE103CS	Computer	Computer Organization & Architecture	3	0	0	3	3	80	10	10	100	40	-	-	-	-
ESC	SE104CS	Electronics	Digital Electronics	3	0	0	3	3	80	10	10	100	40	-	-	-	-
HSMC	SE105CS	HSMC	Effective Technical Communication in English	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	SE106CS	Computer	Data structure & Algorithms	0	0	2	2	-	-	-	-	-	-	25	25	50	25
PCC	SE107CS	Electronics	Digital Electronics	0	0	2	2	-	-	-	-	-	-	25	25	50	25
PCC	SE108CS	Computer	Computer Workshop	0	0	2	2	-	-	-	-	-	-	25	25	50	25
MC	SE109CS	S&H	Environmental Sciences	2	0	0	0	-	-	-	-	-	-	-	-	-	-
				17	0	06	20	-									
				23			20					500				150	
								650									

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fourth Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional MSE	Max. Marks Sessional IE	Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
PCC	SE201CS	S&H	Discrete Mathematics	3	1	0	4	3	80	10	10	100	40	-	-	-	-
PCC	SE202CS	Computer	Design & Analysis of Algorithms	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	SE203CS	Computer	Operating Systems	3	0	0	3	3	80	10	10	100	40	-	-	-	-
ESC	SE204CS	Computer	Object Oriented Programming	3	0	0	3	3	80	10	10	100	40	-	-	-	-
HSMC	SE205CS	S&H	Finance & Accounting	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	SE206CS	Computer	Design & Analysis of Algorithms	0	0	2	2	-	-	-	-	-	-	25	25	50	25
PCC	SE207CS	Computer	Operating Systems	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PCC	SE208CS	Computer	Object Oriented Programming	0	0	2	1	-	-	-	-	-	-	25	25	50	25
				15	1	06	20	-				500				150	
				22			20										
				650													

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
										MSE	IE						
ESC	TE101CS	Electronics	Signals & System	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	TE102CS	Computer	Database Management System	3	1	0	4	3	80	10	10	100	40	-	-	-	-
PCC	TE103CS	Computer	Formal Language & Automata Theory	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	TE104CS	Computer	Java Programming	3	0	0	3	3	80	10	10	100	40	-	-	-	-
HSMC	TE105CS	HSMC	Principles of Management Information System	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PEC	TE106CS	Computer	Ele-I 1.Graph Theory 2.Software Engg. 3.Artificial Intelligence 4.Image Processing	3	0	0	3	3	80	10	10	100	40	-	-	-	-
Mandatory course	TE107CS	MC	Constitution of India	2	0	0	0	-	-	-	-	-	-	-	-	-	-
PCC	TE108CS	Computer	Database Management System	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PCC	TE109CS	Computer	Formal Language & Automata Theory	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PCC	TE110CS	Computer	Java Programming	0	0	2	1	-	-	-	-	-	-	25	25	50	25
				20	1	06	22	-									
				27			**22**					**600**				**150**	
								750									

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
										MSE	IE						
PCC	TE201CS	Computer	Compiler Design	3	1	0	4	3	80	10	10	100	40	-	-	-	-
PCC	TE202CS	Computer	Computer Networks	3	1	0	4	3	80	10	10	100	40	-	-	-	-
PEC	TE203CS	Computer	Ele-II 1.Data Mining 2.Distributed System 3.Machine Learning 4.Human Computer Interaction	3	0	0	3	3	80	10	10	100	40	-	-	-	-
ESC	TE204CS	Computer	Ele-III 1.Computational Geometry 2.Real Time Systems 3.Neural Network and Deep Learning 4.Optimization Techniques	3	0	0	3	3	80	10	10	100	40	-	-	-	-
OEC	TE205CS	Humanities	Open Ele-I 1.Soft Skills and Interpersonal Communication 2.Human Resource Development and Organizational Behavior	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PCC	TE206CS	Computer	Compiler Design	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PCC	TE207CS	Computer	Computer Networks	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PROJ	TE208CS	Computer	Mini Project	0	0	6	3	-	-	-	-	-	-	50	50	100	50
Ind Training	TE209CS	Computer	Industrial Training /Internship/Case Studies (2 to 4 Weeks)##	-	-	-	2	-	-	-	-	-	-	25	25	50	25
				15	2	10	24	-									
				27			24					500				250	
								750									

Industrial Training /Internship/Case Studies:- It is to be completed during the summer vacation after completion of fourth semester and/or winter vacation after the completion of Fifth semester and its planning and allocation should be done during the fourth/ fifth semester and its marks will be awarded in the sixth semester for subject code TE209CS on submission of the certified relevant report at the end of sixth semester

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Seventh Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
										MSE	IE						
PEC	BE101CS	Computer	Ele-IV 1.Quantum Computing 2.Embedded System 3.Soft Computing 4.Cloud Computing	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PEC	BE102CS	Computer	Ele-V 1.Advanced Algorithms 2.Internet of Things 3.Data Analytics 4.Web and Internet Technology	3	0	0	3	3	80	10	10	100	40	-	-	-	-
OEC	BE103CS	Computer	Open Ele-II 1. Cyber Law and Ethics 2. Indian Music System	3	0	0	3	3	80	10	10	100	40	-	-	-	-
BSC	BE104CS	BSC	Biology	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PEC	BE105CS	Computer	Ele-IV Lab	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PEC	BE106CS	Computer	Ele-V Lab	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PROJ	BE107CS	Computer	Project-II	0	0	12	6	-	-	-	-	-	-	75	75	150	75
				12	0	16	20	-									
				28			**20**					**400**				**250**	
												650					

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Eighth Semester Computer Science and Engineering

Course Category	Course Code	BoS	Course Title	Teaching Scheme				Examination Scheme									
				Hours per week			Number of Credits	THEORY						PRACTICAL			
				L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min. Passing Marks
										MSE	IE						
PEC	BE201CS	Computer	Ele-VI 1.Speech and Natural Language Processing 2.Fault Tolerant Computing 3.Information Theory and Coding 4.VLSI System Design	3	0	0	3	3	80	10	10	100	40	-	-	-	-
OEC	BE202CS	Computer	Open Ele-III 1. Introduction to Art and Aesthetics 2.Economic Policies in India	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PEC	BE203CS	Computer	Open Ele-IV 1.Cryptography & Network Security 2.History of Science	3	0	0	3	3	80	10	10	100	40	-	-	-	-
PEC	BE204CS	Computer	Ele-VI	0	0	2	1	-	-	-	-	-	-	25	25	50	25
PROJ	BE205CS	Computer	Project-III	0	0	12	6	-	-	-	-	-	-	75	75	150	75
				9	0	14	16	-									
				23			16					300				200	
													500				

A. Definition of Credit:

1 Hr. Lecture (L) per week 1 credit
1 Hr. Tutorial (T) per week 1 credit
2 Hours Practical(Lab)/week 1 or 2 credit

B. Range of credits – A credits of 160 is required for a student to be eligible to get Under Graduate degree in Engineering.

C. Structure of Undergraduate Engineering program :

S.No	Abbreviations	Category	Suggested Breakup of Credits(Total 160)
1	HSMC	Humanities and Social Sciences including Management courses	12*
2	BSC	Basic Science courses	25*
3	ESC	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	24*
4	PCC	Professional core courses	48*
5	PEC	Professional Elective courses relevant to chosen specialization/branch	18*
6	OEC	Open subjects – Electives from other technical and /or emerging subjects	18*
7	PROJ	Project work, seminar and internship in industry or elsewhere	15*
8	MC	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Knowledge Tradition]	(non-credit)
Total			160*

*Minor variation is allowed as per need of the respective disciplines.

Abbreviations

L	Lecture	MC	Mandatory courses
T	Tutorial	PROJ	Project
P	Practical	MSE	Mid Semester Examination
BSC	Basic Science Courses	IE	Internal Evaluation
ESC	Engineering Science Course	ESE	End Semester Examination
HSMC	Humanities and Social Sciences including Management courses	TW	Term work
PCC	Professional core courses	POE	Performance & Oral Examination
PEC	Professional Elective courses	BoS	Board of Studies (Board)
OEC	Open Elective courses		

CREDITS DISTRIBUTION

Sr.No.	Semester	Total Credits
1	First	19
2	Second	19
3	Third	20
4	Fourth	20
5	Fifth	22
6	Sixth	24
7	Seventh	20
8	Eighth	16
	Total Credits	160

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: TE101CS
Title of the Course: Signals & System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Course Outcomes:
At the end of the course, students will demonstrate the ability to:
1. Analyze different types of signals
2. Represent continuous and discrete systems in time and frequency domain using different transforms
3. Investigate whether the system is stable
4. Sampling and reconstruction of a signal

Units	Contents	Hours
1	**Introduction to Signals and systems:** Signals and systems as seen in everyday life, and in various branches of engineering and science. Energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability, Example	9
2	**Bahaviour of Continuous and LTI Systems:** Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input output behaviour with aperiodic convergent inputs. Characterization of causality and stability of linear shift-invariant systems. System representation through differential equations and difference equations.	9
3	**Fourier Transform:** Fourier series representation of periodic singals, Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and The Discrete Fourier Transform (DFT), Parseval's Theorem.	9
4	**Laplace Transform and Z-Transform**: The Laplace Transform, notion of eigen functions of LSI systems, a basis of eigen functions, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behavior. The z-Transform for discrete time signals and systems- eigen functions, region of convergence, z-domain analysis	9
5	**Sampling and Reconstruction:** The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation between continuous and discrete time systems. State-space analysis and multi-input, multi-output representation. The state-transition matrix and its role	9
	Total	45

Text Books:
1. "Signals and Systems" by Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, PHI.
2. "Signals and Systems" by P. Ramesh Babu, R. AnandaNatarajan, SciTech Publications (India).

Reference books:
1. "Signals and Linear Systems" by Gabel R.A. and Robert R.A, John Wiley and Sons, New York.
2. "Systems and Signal Analysis" by C. T. Chen Publication: Oxford University Press, India.
3. "Introduction to Signals and Systems" by Michael J. Robert, Publication: Tata Mc-Graw Hill.
4. "Signals and Systems" by S. Haykin and B. V. Veen, Publications: John Wiley and Sons, Inc.
5. "Signals and Systems Analysis using, Transform Methods and MATLAB" by M. J. Roberts Tata McGraw-Hill Publishing Company Limited.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE102CS**
Title of the Course: **Database Management System**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to DBMS :Basic concepts, Advantages of a DBMS over file-processing systems, Data abstraction, Data Models and data independence. Components of a DBMS and overall structure of a DBMS Database terminology Data Modeling: Basic Concepts, Types of data models, E-R data model and Object-oriented data model. Relational, Network and Hierarchical data models and their comparison. Basics of ER diagram, E-R and EER diagramming, Reducing E-R Diagrams to Tables, Generalization, and Aggregation.	09
II	Relational Model: Basic concepts. Attributes and domains. concept of integrity and referential constraints. Relational Query Languages (Relational Algebra and relational Calculus).Concepts of View and triggers. SQL: Structure of a SQL query, DDL and DML, SQL queries, Set Operations, Predicates and Joins, Set membership, Tuple variables, set comparison, ordering of tuples, aggregate functions, nested queries, Database modification using SQL.	09
III	Relational Database Design: Normalization, normal forms, Functional Dependencies, 1NF, 2NF, 3NF, Codd's rule, Notion of a normalized relations, Multi-valued dependency and Join dependency.	09
IV	Transaction management: Basic concept of a transaction, Transaction Model , Log Based Recovery, Buffer Management, Checkpoints, Shadow Paging, Failure With Loss of nonvolatile Storage, Stable Storage Implementation. Concurrency Control: Schedules, Testing of Serializability, Lock-based Protocols, Time Stamp Based Protocols, Validation Techniques, Multiple Granularity, Multiversion Schemes, Insert and Delete Operations.	09
V	Database systems Architecture: Centralized, client-server systems, Parallel systems, distributed systems, Web-enabled systems. New Applications: Need for data analysis, Decision support systems, Data Warehouse. On-line Analytical Processing(OLAP), Data mining concepts, spatial and geographical databases, multi-media Databases.	09
	Total	45

Text/Reference Books:

1. Database System Concepts by Henry Korth , S. Sudarsan and Others, McGraw Hill
2. Fundamental of Database System – Elmasari , Navathe & Gupta, Pearson Education.
3. Database Systems by S. K. Singh, Pearson Education.
4. Principles of Database Systems – Ullman, Golgotia Publications 1998.
5. Database System by Connolly, 3rd edition, Pearson Education

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE103CS**
Title of the Course: **Formal Language & Automata Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.	09
II	Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.	09
III	Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.	09
IV	Turing machines: The basic model for Turing machines (TM), Turingrecognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.	09
V	Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.	09
	Total	45

Text/Reference Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.
2. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
3. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
4. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
5. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE104CS**
Title of the Course: **Java Programming**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Object oriented programming concept, comparing JAVA with C, JAVA programming language syntax, variables, data types, statements and expressions, control statements ifelse, for, while and do-while loops, switch statements, named structures, functions , parameter passing, static modifier, console programming	09
II	Features of JAVA: classes and interfaces, Threads and multithreaded programming, Synchronization of threads, dead locks, Exception handling, Introduction to packages, math package, lang package, util package.	09
III	Applets programming: Events, Even driven programs, handling events like buttons, mouse, keyboards etc., Applets and Applets package, fonts, colors, Graphics, Images, Sounds, AWT components, Layout managers, writing event driven programs using components.	09
IV	Streams: I/O in JAVA, I/O packages, handling files random access files, chaining streams	09
V	Network programming: net package, TCP/IP programming, UDP programming, client/server model implementation, getting information from internet. Advanced concepts of JAVA: CORBA, BEANS, JAVADOC ,RMI, Servelets.	09
	Total	45

Text/Reference Books:

1. Introduction to Java programming:, Daneal/Yong PHI
2. Introduction to Java Programming, a primar, Balaguruswamy.
3. The Complete Reference- JAVA 2, Third Edition , by Patrick Naughton, TMH Publications
4. Java 2 Complete Reference – 5th Edition – Herbert Schildt (TMGH).
5. Object oriented programming with JAVA – E. Balguruswamy

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE105CS**
Title of the Course: **Principles of Management Information System**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Nature and Functions of Management, Management yesterday and today, Planning and Decision making.	09
II	Management Information System: Introduction, Conceptual Foundations, Information System Requirement	09
III	Marketing Management: Marketing concept, Indian Marketing Environment, Market segmentation, Market Planning, International Marketing, Financial Management	09
IV	Human Resource Management: Human Resource Planning, Recruitment, Selection, Training and development, Security, Safety and Health	09
V	Organization Behavior: Organization Structure and design. Designing Effective Organization, Managing Job Stress, Organization Development.	09
	Total	45

Text/Reference Books:

1. Principles of Management , P C Tripathi and P N Reddy
2. Management Information System, Gordan Davis and H. Olison Tata McGraw Hill Pub.
3. Human Resources and Personal Management, William Werther and Keith Davis
4. Marketing Management, V S Ramaswamy and S Namakumari
5. Organization Behavior, High Arnold and Daniel Feldman Tata McGraw Hill
6. Financial Management, Khanna.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE106CS**
Title of the Course: **Ele-I: Graph Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Basics – Graphs, degree sequences, distance in graphs, complete, regular and bipartite graphs, basic properties. Structure and Symmetry – Cut vertices, bridges and blocks, automorphism groups, reconstruction problem.	09
II	Trees and connectivity – Properties of trees, Arboricity, vertex and edge connectivity, Mengers theorem	09
III	Eulerian and Hamiltonian graphs – Characterization of Eulerian graphs -Sufficient conditions for Hamiltonian graphs.	09
IV	Colouring and planar graphs – vertex and edge colouring, perfect graphs, planar graphs, Euler's theorem, Kuratowski's theorem, Colouring of planar graphs, Crossing number and thickness.	09
V	Matching, factors, decomposition and domination. Extremal Graph theory – Turan's theorem, Ramsay's theorem, Szemeredi's 97 regularity lemma, applications.	09
	Total	45

Text/Reference Books:

1. J. A. Bondy, U. S. R. Murthy, "Graph Theory", Springer Verlag, 2008.
2. D. B. West, "Introduction to Graph Theory", PHI, 2004.
3. R. Diestel , "Graph Theory", Springer Verlag (Free Download available), 2003.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE106CS**
Title of the Course: **Ele-I: Software Engineering**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Software Engineering, Software, Software Myths, Software Engineering- A Layered Technology, A Process Framework, CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Models: Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models.	09
II	Managing Software Projects: The People, The Product, The Process, W5HH Principle, Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality, Establishing a Software Metrics Program, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation for Object Oriented Projects, The Make/Buy Decision, Project Scheduling, Risk Management, Quality Management, Software Reengineering: Software Maintenance, A Software Reengineering Process Model, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering.	09
III	Software Engineering Practice: The Essence of Practice, Core Principles, Communication Practices, Planning Practices, Modeling Practices, Construction Practice, Deployment, System Engineering: Computer-Based Systems, System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling: Hatley-Pirbhai Modeling and System Modeling with UML	09
IV	Requirements Engineering: Requirements Engineering Tasks, Initiating the Requirements Engineering process, Eliciting Requirements, Developing Use-Cases, Building the Analysis Model, Requirements Analysis, Analysis Modeling approaches, Data Modeling Concepts, Object-Oriented Analysis, Scenario-Based Analysis, Flow-Oriented Modeling, Class-Based Modeling, Creating a Behavioral Model. Design Engineering: Design Concepts, Design Model, Pattern-Based Software Design.	09
V	Testing Strategies And Tactics: A Strategic approach to Software Testing, Strategic Issues, Testing Strategy for Conventional Software and Object-Oriented Software, Validation Testing, System Testing, Validation and Verification Testing Tactics: Software Testing Fundamentals, Black Box and White Box Testing, Basis Path Testing, Control Structure Testing, Object-Oriented Software Testing Methods	09
	Total	45

Text/Reference Books:

1. Software Engineering- A Practitioner's Approach (Sixth Edition)- Roger S. Pressman (TMH)
2. Software Engineering (Seventh Edition)- Ian Summerville, Pearson Education.
3. Software Engineering Theory and Practice by Pfleeger, Pearson Education.
4. Software Engineering- Schaum's Series (TMH)

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE106CS**
Title of the Course: **Ele-I: Artificial Intelligence**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION TO Al AND PRODUCTION SYSTEMS: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics - Specialized production system-Problem solving methods – Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.	09
II	REPRESENTATION OF KNOWLEDGE: Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	09
III	KNOWLEDGE INFERENCE: Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors, Bayesian Theory-Bayesian Network-Dempster – Shafer theory.	09
IV	PLANNING AND MACHINE LEARNING: Basic plan generation systems – Strips - Advanced plan generation systems – K strips -Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.	09
V	EXPERT SYSTEMS: Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems – MYCIN, DART, XOON, Expert systems shells.	09
	Total	45

Text/Reference Books:

1. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill- 2008. (Units-I,II,VI & V)
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
4. Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.
5. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE106CS**
Title of the Course: **Ele-I: Image Processing**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	00	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Image Processing: Scenes And Images, Application Of Image Processing, Image Processing System (Hardware, Software), Elements of Visual Perception, Structure of the Human Visual System, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationship between Pixels, Adjacency, Connectivity, Regions and Boundaries, Logic Operations in Image processing, Image Enhancement in Spatial Domain, Spatial domain Methods, Point processing, Neighbourhood processing, High pass filtering, High-Boost Filtering, Zooming, Image Enhancement based on Histogram Modelling.	09
II	Discrete Image Transform: Linear Transformations:Representation of a Discrete Function, Sampling, One dimensional Discrete Transformations, Two dimensional Discrete Linear Transformations , FFT, DCT, DST, Walsh-Hadamard Transform, Walsh transform, Haar transform, Fast algorithm for computing Hadamard transform, Slant transform, K-L Transform, Wavelet Transform and Subband Coding.	09
III	Image Enhancement in Frequency Domain: Fourier Transform, One dimensional Fourier 09 Transform, Two dimensional Fourier Transform, Properties of DFT, Low Pass Frequency Domain Filters: Ideal Low Pass Filters, Butterworth Low Pass Filters, Gaussian Low Pass Filters, High Pass Frequency Domain Filters: Ideal High Pass Filters, Butterworth High Pass Filters, Gaussian High Pass Filters, High Boost Filtering, Clipping and Thresholding, Homomorphic Filtering, Relationship between Filtering in the spatial and frequency domain	09
IV	Segmentation : Point, Line and Ege Detection, Computing the Gradient, Finding Gradients using Masks: Roberts Mask, Prewitt and Sobel Operators, Compass Operators, Canny Edge Detector, Edge Linking, Connectivity, Region-based Segmentation, Thresholding, Region Extraction, Image Compression: Fidelity Criteria, Image compression Standards, Huffman Coding, LZW Coding, Run-Length Coding, Predictive Coding, Interpolative coding.	09
V	Morphological Image processing: Arithmetic and Logical Operation, Erosion and Dilation, Structuring Elements, Opening and Closing, Hit-or-Miss Transform, Boundary Extraction, Hole(Region) Filling, Thinning, Thickening, Pruning, Morphological reconstruction, Representation and Description: Chain Codes, Polygonal Approximations, Signatures, Medical Axis transform, Moments, Fourier Descriptors, Topological Descriptors, Texture	09
	Total	45

Text/Reference Books:

1. B. Chanda, D. Datta Mujumdar, "Digital Image Processing And Analysis", PHI , 5th Reprint ISBN-81-203-1618-5 2.
2. R.C. Gonzalez, R.R. Woods, "Digital Image Processing Person Education ", ISBN - 81-7808-629-8
3. William Pratt, "Digital Image Processing", John Willey & Sons Inc. ISBN-9-814-12620-9
4. Anil K. Jain, "Fundamentals Of Digital Image Processing", PHI, ISBN-81-203-0929-4

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE107CS**
Title of the Course: **Constitution of India**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
02	00	--	02	00	--	-	-	-	-

Unit	Contents	Hours
I	Introduction to Indian Constitution: Historical background, Philosophy of Indian Constitution, Preamble of Constitution- its forms and Importance, Features of Indian Constitution, The nature of Indian Federation	08
II	Fundamental Rights and Directive Principles: Fundamental Rights- its forms and importance, Fundamental rights in Constitution, Evaluation of Fundamental rights, Fundamental duties, Directive Principles of State Policies(Meaning, Objectives and Source), Classification of Directive Principles, Implementation of Directive Principles	08
III	Composition and Structure of Parliament: Function of Parliament, Law making Procedure, Executive Council structure and Role, State assembly, Changing Trends of Parliament	08
IV	Judiciary and Election Commission Forms of Judiciary, Power, Function and Role of Supreme Court, Judicial Review, Judicial Activism, Structure, Function and Role of Election Commission, Electoral System and Reforms in it	08
V	Socialism of Constitution Provision for Women Empowerment, Protection of Rights of Backward Class, Special Provision for Scheduled Tribes, Protection of Rights of workers, Socialistic democracy, Democracy in India: Challenges Constitutional Institutions and their role, Lokpal and Lokayukt, State Central Relation, Important Amendments, Nationalism, Criminalisation of Politics	08
	Total	40

Text/Reference Books:

1. D. D. Basu, "Introduction to the Constitution of India", LexisNexis Publishers, 23rd Edition, 2018.
2. B. Shiva Rao (Editor), "Framing of Indian's Constitution, Select Documents", Vol. 1, 2015.
3. T. K. Tope, "Constitutional Law of India", Sujata V. Manohar (Editor), Eastern Book Company, 3rd Edition, 2010.
4. Sir Ivor Jennings, "Some Characteristics of Indian Constitution", Geoffrey Cumberlege Publishers, 1953.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE108CS**
Title of the Course: **Database Management System**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	01	25	25	50

	List of Practicals
	The student is expected to perform 10-12 practical's based on following topics.
1	Data Definition, Table Creation, Constraints,
2	Insert, Select Commands, Update & Delete Commands
3	Five experiments on PL/SQL queries.
4	Nested Queries & Join Queries
5	Views
6	High level programming language extensions (Control structures, Procedures and Functions)
7	Front end tools
8	Forms
9	Triggers
10	Menu Design
11	Reports

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE109CS**
Title of the Course: **Formal Language & Automata Theory**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	01	25	25	50

	List of Practicals
	The student is expected to perform 10-12 practicals based on following topics.
1	Practical no. 1 & 2 should be based on NFA to DFA conversion.
2	Practical no. 3 should be based on minimization and equivalence of Automata.
3	Practical no.4 & 5 should be based on conversion of Regular expression to DFA and vice versa.
4	Practical no. 6 should be based on whether a grammar is regular or not by using pumping lemma.
5	Practical no. 7 should be based on checking of Ambiguity of Grammar and Simplification of CFGs.
6	Practical no. 8 should be based on CFG to PDA construction.
7	Practical no.9 &10 should be based on Turing machine.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Fifth Semester Computer Science and Engineering

Course Code: **TE110CS**
Title of the Course: **Java Programming**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	01	25	25	50

	List of Practicals
	Practical: Students should perform 10-12 Experiments from the given list.
1	Programs illustrating overloading and overriding method in JAVA.(Use any application)
2	Programs illustrating the implementation of various forms of inheritance (Ex. Single, Hierarchical, Multilevel inheritance etc.,).
3	Programs which illustrates the implementation of multiple inheritance using interfaces in JAVA.
4	Programs which illustrates the Implementation of Inheritance by Method overriding, Super constructor and super keyword, abstract class (Use any application)
5	Programs which illustrate the manipulation of strings:1) Sorting an array of strings in ascending order. 2) Frequency count of words and characters in a text file. Etc.,
6	Programs for sorting and searching a list of elements.
7	Programs for addition and multiplication of matrices.
8	Programs to create packages in JAVA.
9	Programs to create multiple threads in JAVA.
10	Programs to write applets to draw the various shapes: a) Cylinder b) Cube c) Square inside a circle d) Circle inside a square e) Polygons etc.,
11	Create and manipulate labels, lists, text fields, text areas and panels.
12	Understand and handle mouse events and keyboard events
13	Client/Server interaction with stream socket connections (Use NET packages)
14	Exception Handling for – (a) Divide by zero error (b) Null values (c) Data entry
15	Program to read the data from user and save it to two different files, display the contents and exchange the contents of those two files using IO package.
16	Develop an animation program using Multithreading viz. Bouncing Ball.
17	Program to scroll the banner using applet.
18	Design 8-digit calculator using AWT package and layout managers.
19	Implementation of Client / Server mechanism using Socket classes.
20	Design Database program for Employee details and implement INSERT, SELECT, DELETE, UPDATE queries using JDBC

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE201CS**
Title of the Course: **Compiler Design**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Compilor: Compilers and Translators, why to write compiler, The structure compiler, phases of compiler, bookkeeping, error handling, compiler construction tools, Interpreter and the related issues, Cross compiler, Incremental compiler, Boot strapping, Lexical Analyzer(LEX), LEX specification details.	09
II	Syntax Analysis Introduction: Role of parsers & issues of separating lexical & syntax analysis, parsing technique: Top down parser, Predictive parser, Bottom up parsing, LR parse (SLR, CLR & LALR etc), Implementation of LR parser. Automatic constructions of parser (YACC), YACC specification file details.	09
III	Intermediate code Generation: Syntax-directed translation schemes, Intermediate code, postfix notation, parse tree and syntax tree, Three address codes, quadruples, triples, translation of assignment statements, Boolean expression, Array references in arithmetic expression, procedure calls, Declaration, case statement.	09
IV	Symbol Tables: Contents, Data structure for symbol tables, representing scope information. Error detection and recovery: Error handling: Lexical-phase, Syntactic phase and semantic phase, Code Generation Introduction: Issues in code generation, Target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment, The dag representation of basic blocks, Peephole optimization, Generating code from dags	09
V	Code Optimization: Introduction, Principle sources Of Optimization, optimization of basic blocks, Loop in flow graphs, Introduction to global data flow analysis, Iterative solution of data-flow equations, code improving transformation.	09
	Total	45

Text/Reference Books:

1. A V Aho, R. Sethi, .J D Ullman, "Compilers: Principles, Techniques, and Tools", Pearson Education, ISBN 81 - 7758 - 590 - 8 2.
2. Aho & Ullman , Principles of compiler Design.
3. Lex and Yece-O'relly. 2. Dhamdhere. Compiler Construction, McMillan India
4. Muchnlk -Advanced compiler design & Implementation.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: TE202CS
Title of the Course: Computer Networks

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Computer Networks: Uses of Computer Networks, Types of Networks, Network Hardware, Network software, network design issues, network design tools. ISO's OSI Reference Model & TCP/IP Reference model, Example Networks: Internet, X.25, Frame Relay, ATM, Ethernet, Wireless LANs, Network standardization, Switching, Buffering and Multicasting, MODEM, cable media. Data Link Layer: Design issues, Services, framing, error and flow control, elementary data link protocols: Simplex stop & wait protocol, simplex protocol for noisy channel. Sliding window protocols: Using GO back-N ARQ, using selective repeat ARQ, HDLC. Protocol performance, protocol specification & verification. The Data Link Layer in the Internet & ATM.	09
II	Point-to-Point-Access (PPP): Frame format, Transition states, PPP Stack: LCP, NCP Network Hardware Components: Connectors, Transceivers and Media Converters, Repeaters, NICs, Bridges and Switches. The Medium Access Control Sublayer: Static and dynamic channel allocation, multiple access protocols: ALOHA, CSMA/CD, Collision-free protocols. Limited-contention Protocols, WDMA, wireless LAN protocols. Ethernet: Cabling, encoding, MAC sub-layer protocol, Switched, fast and Gigabit Ethernet, Logical link control, Wireless LANs and Digital Cellular Radio, Broadband Wireless, Virtual LANs, Bluetooth, Virtual Circuit. Switching: Frame Relay and ATM, IEEE 802.3, 802.4, 802.5 standards, FDDI,fast Ethernet & satellite networks.	09
III	Network Layer: Design Issues, Packet switching, Connectionless and Connection-oriented Services, Virtual Circuits and Datagram Subnets, Router, Configuring Router Routing Algorithms, Internetworking, Firewalls	09
IV	Transport Layer: The transport services, elements of transport protocols: Addressing establishing & releasing a connection, flow control and buffering, multiplexing and crash recovery, simple transport protocol, the Internet transport protocol TCP & UDP. Performance issues. Concept of socket and socket programming (TCP/IP,SPX/PX,WINSOCK).	09
V	Application Layer: Domain Name Systems (DNS), and DNS server, Electronic Mail Architecture and services, Message Formats, MIME, message transfer, SMTP, Mail Gateways, Relays, Configuration 50Mail Servers, DHCP, NetBios, File Transfer Protocol, General Model commands, TFTP. World Wide Web: Introduction, Architecture overview, static and dynamic web pages, WWW pages and browsing HTTP, LDAP, Browser Archicture, Caching in Web Browser remote login, Wireless web	09
	Total	45

Text/Reference Books:

1. Tanenbaum A, "Computer Networks", 4 Edition, PHI
2. Fourauzan B., "Data Communications and Networking", 3 edition, Tata McGtaw Hill
3. Keshav S., "An Engineering Approach to Computer Networking", Perason Education, ISBN 981-235-9869
4. Comer D., "Computer Networks and Internet", 2140 Edition, fieatson Education, ISBN 81 -7808-086-9
5. Gallo M., Hancock W., "Computer Communications and networking Technologies", Thomson Brooks/Cole

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE203CS**
Title of the Course: **Ele-II: Data Mining**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Data Mining, What is data mining? Related technologies - Machine Learning, DBMS, OLAP, Statistics , Data Mining Goals, Stages of the Data Mining Process , Data Mining Techniques , Applications of data mining, Major Issues in Data Mining.	09
II	Data objects and Preprocessing : Data Objects and Attribute Types, Data Attribute, Basic Statistical Descriptions of Data, Data Visualization Measuring Data Similarity and Dissimilarity. Data Preprocessing : Data Cleaning , Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.	09
III	Classification and Prediction: What Is Classification?, What Is Prediction?, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back-propagation, Support Vector Machines, K-NN, Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor, Ensemble Methods-Increasing the Accuracy, Model Evaluation and Selection.	09
IV	Cluster analysis: Cluster Analysis: Introduction, applications of clustering, examples of clustering, requirements of clustering in data mining, A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density: Based Methods – Grid: Based Methods – Model: Based Clustering Methods – Clustering , Outlier Analysis.	09
V	Graph Mining, Social Network Analysis, and Multirelational Data Mining: Graph Mining, Social Network Analysis, Multirelational Data Mining. Mining Object, Spatial, Multimedia, Text, and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.	09
	Total	45

Text/Reference Books:

1. Data Mining Techniques by Arun K. Pujari
2. Jiawei Han and Micheline Kamber —Data Mining Concepts and Techniques, Third Edition, Elsevier.
3. Alex Berson and Stephen J. Smith —Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition,Tenth Reprint 2007.
4. Arun K.Pujari, Data mining techniques , second edition,Universities Press.2010.
5. G. K. Gupta —Introduction to Data Mining with Case Studies‖, Easter Economy Edition, Prentice Hall of India, 2006.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE203CS**
Title of the Course: **Ele-II: Distributed System**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction:** Definition, Goals, Types of distributed systems: Distributed Computing System, Distributed Information System, Architecture: Architectural, Styles, System Architecture, Processes and Communication: Virtualization, Servers, Code Migration, Software Agents, Remote Procedure Call, Message Oriented Transient Communication	09
II	**Synchronization:** Distributed Shared Memory: General architecture, Design and Implementation Issues, Consistency Models, Implementing Sequential Consistency Model, Replacement Strategy, Thrashing, Heterogeneous DSM, Physical Clock Synchronization, Logical Clock, Mutual exclusion, Election Algorithms	09
III	**Distributed File Systems:** Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance: Introduction, Process Resilience, Distributed Commit, Recovery.	09
IV	**Distributed Operating Systems:** Amoeba: Design goals, architecture, process management, file management. Mach: Design goals, architecture, process management, memory management	09
V	**Distributed Multimedia Systems:** Introduction, Characteristics of multimedia data, Quality of service management, Resource management, Stream adaptation, Case study : The Tiger Video file server	09
	Total	45

Text/Reference Books:

1. Distributed Systems Principles and Paradigms- A. S. Tanenbaum (2nd Edition) , Pearson Education
2. Distributed Operating Systems - P. K. Sinha (PHI) (For Distributed shared memory and distributed operating systems)
3. Distributed Systems – Concepts & Design by George Coulouris, Jean Dollimore, Tim Kindberg (Pearson Education)

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE203CS**
Title of the Course: **Ele-II: Machine Learning**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Machine Learning, Definition of Machine Learning, Machine Learning with daily life examples, Different Types of Learning, Scope of Machine Learning, Applications of Machine Learning, Examples of Machine Learning, Hypothesis space and inductive bias, evaluation, cross-validation, Overfitting and Underfitting.	09
II	Machine Learning Algorithm: KNN, Decision Tree Algorithm, Support Vector Machine, Kernel function and Kernel SVM, Neural Network Algorithm, Neural Network Representation Problems, The Perceptrons, Training a perceptron, Multilayer Perceptrons, Back Propagation Algorithms.	09
III	Model Selection and Validation, Regularization and stability, Support Vector Machine, Margin and Hard SVM, Soft SVM and Norm Regularization, Kernel Machines, Optimal Seperating hyperplane, Multiclass Kernel machine, One-class Kernel machine.	09
IV	Clustering: Linkage based clustering algorithm, K-means and other cost minimization clustering, Maximum Likelihood Estimator, Linear discriminant Analysis, Latent Variable Models and EM Algorithm, Supervised learning after clustering, A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density Based Methods, Grid Based Methods, Model Based Clustering Methods.	09
V	Dimensionality reduction: Introduction, Subset selection, Principal Component Analysis, Factor Analysis, Multidimensional scaling, Feature selection and Generation, Feature Manipulation and Normalization, Feature Learning.	09
	Total	45

Text/Reference Books:

1. Understanding Machine Learning: From theory to Algorithm by Shai Shalev-Shwartz and Shai Ben-David, Cambridge University Press, First Edition
2. Introduction to Machine Learning by Ethem Alpaydin Third Edition, MIT Press
3. Tom M. Mitchell, "Machine Learning", McGraw-Hill, 2010
4. Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995
5. T. astie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer (2nd ed.), 2009

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE203CS**
Title of the Course: **Ele-II: Human Computer Interaction**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction :** Importance of user Interface – definition, importance of 8 good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface	09
II	**Design process:** Human interaction with computers, importance of 8 human characteristics human consideration, Human interaction speeds, understanding business junctions.	09
III	**Screen Designing :** Design goals – Screen planning and purpose, 8 organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.	09
IV	**Windows :** New and Navigation schemes selection of window, 8 selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors	09
V	**Software tools :** Specification methods, interface – Building Tools. 8 Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.	09
	Total	45

Text/Reference Books:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004.
2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in Human Computer Interaction, Wiley, 2010.
3. Ben Shneiderman and Catherine Plaisant, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition, pp. 672, ISBN 0- 321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE204CS**
Title of the Course: **Ele-III: Computational Geometry**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Convex hulls:** construction in 2d and 3d, lower bounds; 8 Triangulations: polygon triangulations, representations, point-set triangulations, planar graphs.	09
II	**Voronoi diagrams:** construction and applicat ions, variants; Delayney 8 triangulations: divide-and-conquer, flip and incremental algorithms, duality of Voronoi diagrams, min-max angle properties	09
III	**Geometric searching:** point-location, fractional cascading, linear 8 programming with prune and search, finger trees, concatenable queues, segment trees, interval trees; Visibility: algorithms for weak and strong visibility, visibility with reflections, art-gallery problems	09
IV	**Arrangements of lines:** arrangements of hyper planes, zone theorems, 8 many-faces complexity and algorithms; Combinatorial geometry: Ham- sandwich cuts.	09
V	**Code Generation:** Design Issues, the Target Language. Addresses 8 in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator. Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis.	09
	Total	45

Text/Reference Books:

1. Computational Geometry – Algorithms and Applications, Second Revised Edition, Mark de Berg, et al., Springer, 1998.
2. Discrete and Computational Geometry, Satyan L. Devadoss and Joseph O'Rourke, Princeton University Press, 2011.
3. Computational Geometry – an Introduction, Franco Preparata and Michael Shamos, Springer-Verlag, 1985.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE204CS**
Title of the Course: **Ele-III: Real Time Systems**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction Definition, Typical Real Time Applications:** Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.	09
II	**Real Time Scheduling Common Approaches to Real Time Scheduling**: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of EffectiveDeadlineFirst (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.	09
III	Resources Sharing Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.	09
IV	Real Time Communication Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols	09
V	Real Time Operating Systems and Databases Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time databases	09
	Total	45

Text/Reference Books:

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Phillip A Laplanta,SeppoJ.Ovaska Real time System Design and Analysis Tools for practitioner, Wiley
3. Mall Rajib, "Real Time Systems", Pearson Education
4. Albert M. K. Cheng , "Real-Time Systems: Scheduling, Analysis, and Verification", Wiley.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE204CS**
Title of the Course: **Ele-III: Neural Network and Deep Learning**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Fundamentals Of Neural Networks – Model of Artificial Neuron – Neural Network Architectures – Learning Methods – Taxonomy Of Neural Network Architectures – Applications	09
II	FEED FORWARD NEURAL NETWORKS: Perceptron Models: Discrete, Continuous and Multi-Category –Training Algorithms: Discrete and Continuous Perceptron Networks – Limitations of the Perceptron – Model. Credit Assignment Problem – Generalized Delta Rule, Derivation of Back propagation (BP) Training, and Summary of Back propagation Algorithm –Kolmogorov Theorem	09
III	OTHER ANN ARCHITECTURES: Associative Memory – Exponential BAM – Associative Memory For Real Coded Pattern Pairs – Applications Adaptive Resonance Theory – Introduction – ART 1 – ART2 – Applications – Neural Networks Based On Competition – Kohenen Self Organizing Maps – Learning Vector Quantization – Counter Propagation Networks – Industrial Applications.	09
IV	DEEP LEARNING: Deep Feed Forward network, regularizations, training deep models, dropouts, Training Deep Neural Networks using Back Propagation-Setup and initialization issues, vanishing and exploding Gradient problems, Gradient- Descent Strategies	09
V	CONVOLUTIONAL NEURAL NETWORK: Basic structure of Convolutional Network, Case studies: Alex net, VGGNet, GoogLeNet, Applications of CNN– Object Detection, Content based image Retrieval.	09
	Total	45

Text/Reference Books:

1. Charu C. Aggarwal "Neural Networks and Deep learning" Springer International Publishing, 2018
2. Satish Kumar, "Neural Networks, A Classroom Approach", Tata McGraw -Hill, 2007.
3. Simon Haykin, "Neural Networks, A Comprehensive Foundation", 2nd Edition, Addison Wesley Longman, 2001.
4. Bishop, Christopher M. Pattern Recognition and Machine Learning. Springer, 2006
5. Duda, Richard, Peter Hart, and David Stork. Pattern Classification. 2nd ed. New York, NY: Wiley-Interscience, 2000

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE204CS**
Title of the Course: **Ele-III: Optimization Techniques**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction:** Introduction to OR Modeling Approach and Various Real Life Situations Linear Programming Problems (LPP) : Basic LPP and Applications ; Various Components of LP Problem Formulation Solving Linear Programming Problems : Solving LPP : Using Simultaneous Equations and Graphical Method ; Simplex Method ; Duality Theory ; Charnes' Big – M Method . Transportation Problems and Assignment Problems.	09
II	**Network Analysis :** Shortest Path : Dijkstra Algorithm ; Floyd Algorithm ; Maximal Flow Problem (Ford-Fulkerson); PERT-CPM (Cost Analysis, Crashing, Resource Allocation excluded) .	09
III	**Inventory Control :** Introduction ; EOQ Models ; Deterministic and probabilistic Models ; Safety Stock ; Buffer Stock.	09
IV	**Game Theory :** Introduction ; 2- person Zero – sum Game; Saddle Point ; Mini-Max and 6L Maxi-Min Theorems (statement only); Games without saddle point ; Graphical Method ; Principle of Dominance.	09
V	**Queuing Theory :** Introduction ; Basic Definitions and Notations ; Axiomatic Derivation of the 7L Arrival & Departure (Poisson Queue). Pure Birth and Death Models; Poisson Queue Models : M/M/1 : ∞ /FIFO and M/M/1: N/ FIFO.	09
	Total	45

Text/Reference Books:

1. H.A. Taha, "Operations Research", Fifth Edn. Macmillan Publishing Company, 1992.
2. Hadley G., "Linear Programming" Narosa Publishers, 1987
3. Hillier F. & Liebermann G.J., "Introduction to Operations Research" 7/e (with CD), THM
4. Mustafi: Operations Research, New Age International

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE205CS**
Title of the Course: **Open Ele-I: Soft Skills and Interpersonal Communication**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Soft Skills: An Introduction** – Definition and Significance of Soft Skills; Process, Importance and Measurment of Soft Skill Development. **Self-Discovery:** Discovering the Self; Setting Goals; Beliefs, Values, Attitude, Virtue. **Positivity and Motivation:** Developing Positive Thinking and Attitude; Driving out Negativity; Meaning and Theories of Motivation; Enhancing Motivation Levels.	09
II	**Interpersonal Communication:** Interpersonal relations; communication models, process and barriers; team communication; developing interpersonal relationships 7 through effective communication; listening skills; essential formal writing skills; corporate communication styles – assertion, persuasion, negotiation. **Public Speaking:** Skills, Methods, Strategies and Essential tips for effective public speaking. **Group Discussion:** Importance, Planning, Elements, Skills assessed; Effectively disagreeing, Initiating, Summarizing and Attaining the Objective. **Non-Verbal Communication:** Importance and Elements; Body Language. **Teamwork and Leadership Skills:** Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.	09
III	**Interview Skills:** Interviewer and Interviewee – in-depth perspectives. Before, During and After the Interview. Tips for Success. **Presentation Skills:** Types, Content, Audience Analysis, Essential Tips – Before, During and After, Overcoming Nervousness. **Etiquette and Manners** – Social and Business. **Time Management** – Concept, Essentials, Tips.	09
IV	**Personality Development** – Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills. **Decision-Making and Problem**-Solving Skills: Meaning, Types and Models, Group and Ethical Decision-Making, Problems and Dilemmas in application of these skills. **Conflict Management:** Conflict - Definition, Nature, Types and Causes; Methods of Conflict Resoultion.	09
V	**Stress Management:** Stress - Definition, Nature, Types, Symptoms and Causes; Stress Analysis Models and 8 Impact of Stress; Measurement and Managemet of Stress **Leadership and Assertiveness Skills:** A Good Leader; Leaders and Managers; Leadership Theories; Types of Leaders; Leadership Behaviour; Assertivness Skills. **Emotional Intelligence:** Meaning, History, Features, Components, Intrapersonal and Management Excellence; Strategies to enhance Emotional Intelligence.	09
	Total	45

Text/Reference Books:

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012.
2. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: TE205CS
Title of the Course: Open Ele-I: Human Resource Development and Organizational Behavior

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction**: to the course What is Organizational Behaviour (OB) and Human Resource Management (HRM) Difference between corporates and development organizations OB and HRM and Sustainable development OB and HRM: contribution and linkages with sustainability Importance of OB and HRM for sustainable development practitioners	09
II	**Knowing and Managing Yourself Individual Behaviour:** MARS model of individual behaviour Values: Values across cultures (Hofstede's framework); Personality: Big five model; MBTI; Use of personality tests; Personality attributes influencing OB Emotions: Understanding emotions; Emotional labour; Emotional Intelligence Attitudes: Attitudes v/s values; Job Satisfaction; Organizational Commitment Perception: Factors influencing perception; 3 3 Perceptual errors; Self-fulfilling prophecy; Know yourself: Johari window	09
III	**Motivation in the workplace**: What is motivation; Early theories of motivation; Contemporary theories of motivation; Designing motivating jobs: JCM model; motivation of social workers. **Work Teams:** Teams v/s groups; Why teams; A model of Team effectiveness: Context, Composition, Work design, Process; Virtual teams; Turning individuals into team players **Communication**: What is communication; Organizational communication: Formal networks and Grapevine; Electronic communications; Barriers to effective communication; non- verbal communication; Improving Interpersonal communication: Empathy and Active listening	09
IV	**Leadership**: Difference between managers and leaders; Perspectives of leadership: Trait, Behavioural, Contingency; Inspirational leadership: Transactional, Transformational, Charismatic; NGO leadership **Job Analysis**: Job description; Job Specification; Job Evaluation **Recruitment, Selection, Orientation**: Sources of recruitment: Internal and external; Steps in selection process; Socialization and Induction; NGO recruitment	09
V	**Performance Management**: What is performance appraisal; Purposes, Process and Uses; Methods of Performance Appraisal: Traditional and Modern; problems in Performance Appraisal; Designing effective performance appraisal systems **Compensation Management**: What is compensation; Objectives and factors determining compensation; Methods of Job Evaluation; Developing pay structures, Executive remuneration; components of compensation; Incentives	09
	Total	45

Text/Reference Books:

1. McShane, S.L. and Von Glinow, M.A., Organizational Behaviour, New Delhi, Tata McGrawHill Publishing company ltd.
2. P. Jyothi, P. and Venkatesh, D.N., Human Resource Management, New Delhi, Oxford University Press.
3. Denhardt, R.B., Denhardt, J.V., and Aristigueta, M.P. (2009), Managing Human Behaviour in Public and Non-Profit Organizations, Second edition. California, Sage Publications.
4. Pynes, J.E. (2004). Human Resources Management for Public and Nonprofit Organizations, Second Edition. San Francisco, CA: Jossey- Bass Publishers.
5. Drucker, Peter F. Managing the Non-profit Organization: Principles and Practices. Harper Business, 1990.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE206CS**
Title of the Course: **Compiler Design**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	01	25	25	50

	List of Practicals
	The student is expected to perform 10-12 practicals based on following topics.
1	Practical no. 1 & 2 should be based on Phases of compilation and lexical analysis
2	Practical no. 3 & 4 should be based on push-down automata and bottom- up parsing.
3	Practical no.5 & 6 should be based on semantic analysis **and** symbol table.
4	Practical no. 7 & 8 should be based on parameter passing andintermediate code generation.
5	Practical no. 9 & 10 should be based on code improvement and peep-hole optimization.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE207CS**
Title of the Course: **Computer Networks**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	01	25	25	50

	List of Practicals
	The student is expected to perform 10-12 practicals based on following topics.
1	Programs on Error detection and correction: CRC, Hamming Code, Checksum, etc Use network simulators like NS2 to implement.
2	Monitoring traffic for the given topology
3	Analysis of CSMA and Ethernet protocols .
4	Network Routing: Shortest path routing, DVR, LSR.
5	Analysis of congestion control (TCP and UDP).
6	Write a program in C/C++ to implement an Client-Server program, using Socket programming
7	Write a program in C/C++ to implement a Client-Server program, using Socket programming with Stop and Wait protocol.
8	Write a program in C/C++ to implement a Client-Server program, using Socket programming with Sliding Window Protocols.
9	Study of existing LAN and understand the design and various components. Set up a small network of 3 to 4 computers and Hub/Switch as directed by the instructor. Use LAN Card, UTP Cables and Connectors. Install LAN Cards and Crimp the connectors. Assign unique IP addresses and share C drive on each machine. Test the network by using PING command. Use protocol analyzer Software. Repeat the assignment by installing two LAN Cards in one of the machines. Repeat the same assignment by adding a router. Configure the router and use RIP.
10	Study of Network monitoring software like ETHREAL software. Assignment to examine TCP/IP and non-TCP/IP protocols (IPX/SPX) and capture them using protocol analyzer Software
11	Study of Linux and/or Novel Netware Network configurations and commands
12	Installation and configuration of US /PWS/Apache server.
13	File transfer using RS-232
14	File transfer using Stop and Wait Protocol / Go back n / Selective Repeat Protocol
15	Implementation of Shortest Path algorithm .
16	File transfer using TCP
17	File Transfer using UDP
18	Data transfer application using TCP/IP protocol suite.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE208CS**
Title of the Course: **Mini Project**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	06	06	03	50	50	100

	Guidelines:
1	The mini-project is a team activity having 3-4 students in a team.
2	The mini project may be a complete Software or a combination of hardware and software
3	Mini Project should cater to a small system required in laboratory or real life.
4	After interactions with course coordinator and based on comprehensive literature survey/need analysis, the student shall identify the title and define the aim and objectives of mini-project.
5	Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.
6	The student is expected to exert on Analysis, Design, development and testing of the proposed work as per the schedule.
7	Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.

Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Model AICTE Curriculum
Sixth Semester Computer Science and Engineering

Course Code: **TE209CS**
Title of the Course: **Industrial Training /Internship/Case Studies (2 to 4 Weeks)**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	00	00	02	25	25	50

	Guidelines:
	The student is expected to perform one or more following activities related to core industry
1	Shall visit industry and understand work culture and work environment.
2	Shall undertake internship in the industry
3	Shall undertake industry based live project under the supervision of industry person who will regularly monitor the progress of the project.