

SRI KRISHNADEVARAYA UNIVERSITY :: ANANTAPUR

College of Engineering & Technology

Academic Regulations 2015 (R15) for

B. Tech (Regular-Full time)

(With effect from the Academic Year 2015-16 for the students admitted into I year I semester)

1. Award of B.Tech. Degree

A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfils the following academic regulations:

- i. Pursue a course of study for not less than four academic years and in not more than eight academic years. However, for the students of availing Gap year facility this period shall be extended up to 2 year at the most and these two years would not be counted for the maximum time for graduation.
- ii. Register for 228 credits and secure all 228 credits.
- iii. Students, who fail to fulfill all the academic requirements for the award of the degree within Eight (Ten for GAP year students) academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled.

2. Courses of study

The following courses of study are offered at present under B. Tech. program with effect from the academic year 2015-16.

S. No.	Branch
01.	Civil Engineering
02.	Computer Science & Engineering
03.	Electrical and Electronics Engineering
04.	Electronics and Communication Engineering
05.	Mechanical Engineering

and any other course as approved by the authorities of the University from time to time.

The entire course of study is of four academic years in semester pattern (for regular students) and of three academic years in semester pattern (for lateral entry students).

3. Credits

	Semester	
	Periods/Week	Credits
Theory	04	04
Practical	03	02
Drawing	03	02
	06	04
Online examination	-	02
Project	12	8

4. Course pattern:

- i. The entire course of study is of four academic years on semester pattern.
- ii. A student eligible to appear for the end examination in a subject, but absent in it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- iii. When a student is detained due to lack of credits / shortage of attendance, he may be re-admitted when the semester / year is offered next after fulfillment of academic regulations.

5. Distribution and Weightage of Marks

- i. The performance of a student in each semester for academic year I, II, III, IV shall be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition Mini Project, Seminar, Comprehensive Viva Voce and Project Work shall be evaluated for 50, 50, 100 and 150 marks respectively.

- ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments) and 70 marks for the External Examination.
- iii. For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination consists of subjective paper for 25 marks with duration of 1 hour 30 minutes.

First midterm examination shall be conducted for the first half of the syllabus in the middle of the semester and second midterm examination shall be conducted for the second half of the syllabus towards the end of the semester. A weightage of 0.75 for better score and 0.25 for the other score will be considered for awarding the sessional marks in both the midterm examinations. There shall be two assignments in each semester for award of 05 marks so that midterm component will be 30 marks (25 for midterm examinations + 05 marks for assignments).
- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another internal examiner.
- v. The Engineering Drawing/Graphics course, offered is to be treated as a Theory Course. Evaluation method adopted shall be same as for any other Theory Course. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two mid term exams in a semester for a duration of 2 hrs each, evenly distributed over the syllabi, for 15 marks giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. The sum of day to day evaluation and the internal tests will be the final sessionals for the subject.
- vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks. There shall be no external examination for seminar.
- vii. There shall be two comprehensive online examinations conducted internally, one in II-II and another in III-II. A student is supposed to secure minimum of 35% marks to secure 2 credits.
- viii. There shall be two choice based credit courses (for other branch students), one in II- I and another in III-II. Each department shall offer a minimum of 3 subjects in such courses. A student shall be given a choice to select any one subject from the list of subjects offered by all faculties under choice based credit courses.
- ix. There shall be two choice based credit courses (same branch students) in IV- I semester. A minimum of six courses must be offered, out of which 2 courses shall be selected by the students.
- x. Massive Open Online Courses (MOOCs) are to be introduced. There shall be 2 MOOCs in the entire course duration.
- xi. A minimum of six online courses (MOOCs) must be offered, out of which 2 courses shall be selected by the students in any each semester as stated above. The students shall register for the opted online courses at the college or offered by authorized institutions/Agencies. The Certificate issued by the college/institution/agency after successful completion of the course shall be considered for the award of credits by the College.
- xii. Out of a total of 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by Board of Examiners consisting of Project Supervisor, Head of Department and an External Examiner. The evaluation of project work shall be conducted at the end of the IV year II Semester. The Internal Evaluation shall be on the basis of two seminars of each 25 marks, one will be presented to the project supervisor and another will be presented to the Department committee comprising Head of the Department, Project Supervisor, and one senior faculty of the Department.
- xiii. Comprehensive Viva Voce will be conducted by the Board of Examiners at the time of evaluation of the Project Work, to test the overall subject knowledge of the entire course.

6. Attendance Requirements:

- i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.
- ii. Shortage of Attendance below 62% in aggregate shall in NO case be condoned.
- iii. Shortage of attendance in aggregate up to 13% (62% and above and below 75%) in each semester may be granted by the College Academic Committee valid on Genuine grounds with supporting evidence.
- iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester, as applicable. They may seek re-admission for that semester when offered next.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

7. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar he should secure 40% in the internal evaluation.
- ii. A student shall be promoted from II to III year only if he fulfills the academic requirement of securing **40** credits from the preceding regular and supplementary examinations.
- iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68** credits from the preceding regular and supplementary examinations.
- iv. Lateral Entry students shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing **40 credits** from the preceding regular and supplementary examinations.
- v. Students who fail to earn 228 credits as indicated in the course structure within eight academic years (10 years for Gap year students) from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 1.1.

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, and they will be in the academic regulations into which the candidate is presently readmitted.

Candidate who were permitted with GAP year shall be eligible for rejoining into the succeeding year of their B.Tech from the commencement of class work and they will be in the academic regulations into which the candidate is presently rejoining.

9. With-holding of results:

If the candidate has any dues not paid to the College or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld and he/she will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

10. GAP Year: Concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The Head of the respective department shall forward such proposals submitted by the students to the College. An evaluation committee shall be constituted by the College to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student(s) to avail the Gap Year.

11. Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above
First Class	Below 70% but not less than 60%
Second Class	Below 60% but not less than 50%
Pass Class	Below 50% but not less than 40%

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum). If any candidate passes through supplementary examinations beyond the duration of the course, he/she may be awarded class based on the % of marks secured as above, except distinction.

i. Grading System is to be introduced. After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Table – Conversion into Grades and Grade Points assigned

Range in which the marks in the subject fall	Grade	Grade points Assigned
≥ 90	S (Superior)	10
80-89	A+ (Excellent)	9
70-79	A (Very Good)	8
60-69	B (Good)	7
50-59	C(Average)	6
40-49	D (Satisfactory)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

12. The minimum instruction days including exams for each semester shall be 90 days.

13. There shall be no branch transfers after the completion of admission process.

14. The academic regulations should be read as a whole for purpose of any interpretation.

15. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the University is final.

16. The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles with effect from the dates notified..

B.Tech I Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Functional English	4	-	4
2.		Mathematics	4	-	4
3.		Engineering Physics	4	-	4
4.		Problem Solving and Programming	4	-	4
5.		Engineering Graphics	2	3	4
6.		Physics Lab	-	3	2
7.		Programming Lab	-	3	2
8.		Engineering Workshop & IT Workshop	-	3	2
		TOTAL			26

L – Lecture, P – Practical

B.Tech I Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Communicative English	4	-	4
2.		Mathematical Methods	4	-	4
3.		Engineering Chemistry	4	-	4
4.		Data Structures	4	-	4
5.		Digital Design	4	-	4
6.		Communication Skills Lab	-	3	2
7.		Chemistry Lab	-	3	2
8.		Data Structures Lab	-	3	2
		TOTAL			26

L – Lecture, P – Practical

B.Tech II Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Probability & Statistics	4	1	-	4
2.		Operating Systems	4	1	-	4
3.		Object Oriented Programming through JAVA	4	1	-	4
4.		Computer Organisation	4	1	-	4
5.		Basic Electrical and Electronics Engineering	4	1	-	4
6.		Choice Based Credit Courses (For non CSE students) 1. Data Structures 2.Object Oriented Programming 3.Operating Systems	4	1	-	4
7.		Operating Systems & Java Programming Lab	-	-	3	2
8.		Electrical and Electronics Lab	-	-	3	2
9.		Human Values and Professional Ethics	2			
		TOTAL	26	6	6	28

L – Lecture, T – Tutorial, P - Practical

B.Tech II Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Managerial Economics and Financial Analysis	4	1	-	4
2.		Unix & Shell Programming	4	1	-	4
3.		Database Management Systems	4	1	-	4
4.		Mathematical Foundations of Computer Science	4	1	-	4
5.		Formal Languages and Automate Theory	4	1	-	4
6.		Web Technologies	4	1	-	4
7.		Database Management Systems Lab	-	-	3	2
8.		Web Technologies Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P - Practical

B.Tech III Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Engineering	4	1	-	4
2.		Design and Analysis of Algorithms	4	1	-	4
3.		Computer Networks	4	1	-	4
4.		Environmental Science	4	1	-	4
5.		Data Warehousing and Data Mining	4	1	-	4
6.		Microprocessors and Micro Controllers	4	1	-	4
7.		Data Warehousing and Data Mining Lab	-	-	3	2
8.		Microprocessors and Micro Controllers Lab	-	-	3	2
9.		Advanced Communications Skills Practice			3	
		TOTAL	24	6	6	28

L – Lecture, T – Tutorial, P – Practical

B.Tech III Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Object Oriented Analysis and Design	4	1	-	4
2.		Compiler Design	4	1	-	4
3.		Mobile Application Development	4	1	-	4
4.		Advanced Computer Networks	4	1	-	4
5.		Artificial Intelligence	4	1	-	4
6.		Choice Based Credit Courses (For Non CSE students) 1. Web Technologies 2. Principles of Database Systems 3. Unix & Shell Programming	4	1	-	4
7.		UML & Compiler Design Lab	-	-	3	2
8.		Computer Networks & Mobile Application Development Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P - Practical

B.Tech IV Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Testing Methodologies	4	1	-	4
2.		Big Data Analytics	4	1	-	4
3.		Management Science	4	1	-	4
4.		Cloud Computing	4	1	-	4
5.		Choice Based Credit Courses (For CSE Students) 1. Grid and cluster computing 2. Internet of Things 3. C# & .Net	4	1	-	4
6.		Choice Based Credit Courses (For CSE Students) 1. Human Computer Interaction 2. Distributed Database 3. Semantic Web & Social Networks	4	1	-	4
7.		Cloud Computing and Big Data Lab	-	-	3	2
8.		Software testing and case tools lab	-	-	3	2
		Mini Project	-	-	-	2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

B.Tech IV Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Project Management	4	1		4
2.		Internetworking with TCP/IP	4	1		4
3.	MOOCs-I	Massive Open Online Courses-I 1. Mongo DB 2. Ethical Hacking 3. Computer and Hacking forensics	4	-	-	4
4.	MOOCs-II	Massive Open Online Courses-II 1. Mobile and Adhoc Networks 2. Advanced Computer Architecture 3. Social Networks	4	-	-	4
5.		Project Work	-	-	-	8
6.		Seminar	-	-	-	2
7.		Comprehensive Viva-Voce	-	-	-	4
		TOTAL	16	2	-	30

L – Lecture, T – Tutorial, P – Practical

B.Tech I Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Functional English	4	-	4
2.		Mathematics	4	-	4
3.		Engineering Physics	4	-	4
4.		Problem Solving and Programming	4	-	4
5.		Engineering Graphics	2	3	4
6.		Physics Lab	-	3	2
7.		Programming Lab	-	3	2
8.		Engineering Workshop & IT Workshop	-	3	2
		TOTAL			26

L – Lecture, P – Practical

UNIT – I**Environmental Consciousness**

Green Cover, Pollution

Tenses, Prepositions, Prepositional Phrases, Writing Letters

UNIT – II**Emerging Technologies**

Solar Thermal Power, Cloud Computing

Subject-Verb Agreement, Prefixes and Suffixes, Compound Nouns, Imperatives

UNIT – III**Global Issues**

Child Labour, Food Crisis

Synonyms & Antonyms, Verbs: Regular & Irregular, Homonyms, Homophones and Homographs, Direct and Indirect Speech

UNIT – IV**Global Issues**

E-Waste, Assistive Technology

Articles, Collocations, Conjunctions, Note-Making, Making Recommendations, If Conditional

UNIT – V**Space Trek**

Hubble Telescope, A Home in the Sky

Degrees of Comparisons, Voice, Question Tags

UNIT – VI**Media Matters**

The Evolution of Media, Ten Developments in Media, Advertisements

Paragraph Writing, Effective Writing, Writing Reports, Expansion of Proverbs and Idioms, Commonly Confused Words

TEXT BOOKS:

1. Mindscapes: English for Technologists and Engineers, Paper Back 2012 by Anna University.

Unit-I

Exact, linear and Bernoulli's equations, Orthogonal trajectories. Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $xV(x)$. Method of variation of parameters.

Unit-II

Taylor's and Maclaurin's series-Functions of several variables-Jacobian-Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers with three variables only. Radius of curvature.

Unit-III

Multiple integral-Double and triple integrals-Change of variables-Change of order of integration.

Unit-IV

Vector Calculus: Gradient-Divergence-Curl. Vector Integration-Line integral-Area-Surface and Volume integrals. Vector integral theorems: Green's theorem-Stoke's theorem-Gauss Divergence theorem (Without proofs). Applications of Green's, Stoke's and Gauss Divergence theorems.

Unit-V

Laplace Transforms: Definition-Transform of elementary functions-Properties of Laplace Transforms-Transform of derivatives-Transform of integrals-Unit step function-multiplication by t^n -Division by t -Evaluation of integrals by Laplace Transforms-Laplace Transform of periodic functions.

Unit-VI

Inverse Laplace Transforms-Partial fractions-Other methods of finding inverse transforms-Convolution theorem-Applications of Laplace transforms to Ordinary differential equations of first and second order.

TEXT BOOKS:

1. A Text Book of Engineering Mathematics, Vol. I, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand and Company.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna publishers.
3. Engineering Mathematics-I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

REFERENCES:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
2. Higher Engineering Mathematics, by B.V. Ramana, McGraw Hill Publishers.
3. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

UNIT I

OPTICS: Interference- Interference in thin film by reflection-Newton's rings-Diffraction-Fraunhofer diffraction due to single slit-Fraunhofer diffraction due to double slit and diffraction grating.

UNIT II

CRYSTALLOGRAPHY: Introduction-Space lattice- Unit cell-Lattice parameters –Bravias lattice-Crystal system-Packing fraction of SC, BCC and FCC –Directions and planes in crystals-Miller indices-Interplanar spacing in cubic crystals-X-ray diffraction–Bragg's law.

UNIT III

QUANTUM MECHANICS: Matter waves-de Broglie hypothesis and properties-Heisenberg's uncertainty principle-Schrödinger's time dependent and independent wave equations-Physical significance of wave function-Particle in one dimensional infinite potential well.

UNIT IV

SEMICONDUCTORS: Intrinsic and Extrinsic semiconductors-Drift and Diffusion currents and Einstein's equation-Hall effect-Formation of p-n junction.

MAGNETIC MATERIALS: Basic definitions- Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials-Hysteresis- Soft and Hard magnetic materials.

UNIT V

SUPERCONDUCTIVITY: Introduction-General properties-Meissner effect-Penetration depth-Effect of magnetic field-Type I and Type II superconductors-Flux quantization-Josephson effects-Application of superconductors.

UNIT VI

LASERS: Introduction- Spontaneous and stimulated emission of radiation-Einstein's coefficients-Population inversion-Ruby laser-He-Ne laser-Application of lasers.

FIBER OPTICS: Introduction-Principle of optical fiber-Acceptance angle and Acceptance cone-Numerical aperture-Types of Optical fibers-Application of optical fibers.

Text Books:

1. Engineering Physics-K. Thyagarajan, MacGraw Hill Education (India) Private Limited, New Delhi, 2015.
2. Engineering Physics- K. Vijay Kumar, S. Chand & Co. Ltd.

References:

1. Engineering Physics-P.K. Palaniswamy, 2nd Edition, SciTech Publications
2. Engineering Physics-S. Maninaidu-Pearson Education Private Ltd.
3. Physics for Engineers-N.K. Verma, 1st Edition, PHI Learning Private Ltd.

4

Unit I- Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

Unit II- Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Arithmetic Expressions, Formatting Numbers in Program Out, Interactive Mode, Batch Mode and Data Files.

Unit III- Selection Structures : Control Structures, Conditions, The if Statement, if Statements with Compound Statements, Decision Steps in Algorithms, Nested if Statements and Multiple-Alternative Decisions, The switch Statement. Repetition and Loop Statements: Repetition in Programs, Counting Loops and the while Statement, Computing a Sum or a Product in a Loop, The for Statement, Conditional Loops, Loop Design, Nested Loops, The do-while Statement and Flag-Controlled Loops. Simple Data Types: Representation and Conversion of Numeric Types, Representation and Conversion of Type char, Enumerated Types, Iterative Approximations

Unit IV- Top Down Design with Functions: Building Programs from Existing Information, Library Functions, Top-Down Design and Structure Charts, Functions without Arguments, Functions with Input Argument. Modular Programming (Functions): Functions with Simple Output Parameters, Multiple Calls to a Function with Input/Output Parameters, Scope of Names, Formal Output Parameters as Actual Arguments, A Program with Multiple Functions. Arrays: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Array Arguments, Searching and Sorting an Array, Multidimensional Arrays.

Unit V- Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Memory Allocation Functions, Programming Applications, Pointer to Functions, Command- Line Arguments. Strings: String Basics, String Library Functions: Assignment and Substrings, Longer Strings: Concatenation and Whole-Line Input, String Comparison, Arrays of Pointers, Character Operations, String-to-Number and Number-to-String Conversions.

Unit VI- Recursion: The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array and String Parameters, Problem Solving with Recursion, A Classic Case Study in Recursion: Towers of Hanoi. Structure and Union: User-Defined Structure Types, Structure Type Data as Input and Output Parameters, Functions Whose Result Values Are Structured, Problem Solving with Structure Types, Parallel Arrays and Arrays of Structures, Union Types.

Unit VII- Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

Unit VIII- Dynamic Memory Allocation, Introduction to Data Structures: Linear and Non Linear Data Structures, Searching and Sorting: Bubble Sort, Selection Sort, Linear Search, Binary Search.

.TEXT BOOKS :

1. Problem Solving and Programming Design in C, J.R.Hanly & Elliot B..Koffman 5th Edition, Pearson Addison Wessley.

REFERENCES :

2. Programming in C and Data Structures, J.R.Hanly, Ashok.N.Kamthane & A.AnandaRao, Pearson Education.

3. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.

4. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press

5. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr.N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand

6. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill

7. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance- Conventions in Drawing-Lettering – BIS Conventions. Scales: Plain, Diagonal and Vernier;

UNIT II

Curves used in Engineering Practice.

a) Conic Sections including the Rectangular Hyperbola- General method only, b) Cycloid, Epicycloid and Hypocycloid.

UNIT III

Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

Projections of Lines: lines inclined to one or both planes, Problems on projections, Finding True lengths.

UNIT IV

Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT V

Projections of Solids: Projections of Regular Solids with axis inclined to one plane.

UNIT VI

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Conversion of isometric Views to Orthographic Views.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai

References:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana, 2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, K.C. John, PHI, 2013
5. Engineering Drawing, B.V.R. Gupta, J.K. Publishers

B.Tech I Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Communicative English	4	-	4
2.		Mathematical Methods	4	-	4
3.		Engineering Chemistry	4	-	4
4.		Data Structures	4	-	4
5.		Digital Design	4	-	4
6.		Communication Skills Lab	-	3	2
7.		Chemistry Lab	-	3	2
8.		Data Structures Lab	-	3	2
		TOTAL			26

L – Lecture, P – Practical

UNIT – I

Lessons from the Past

The Importance of History, The Mother of Modern Corporatism

Pure Vowels, Just-A-Minute, Designing Posters

UNIT – II

Energy

In Search of Our Energy Solutions, Wind Energy

Diphthongs, Role Play, Making Conversation/Situational Dialogues

UNIT – III

Engineering Ethics

Learning from Disasters, Biotechnology: Ethical Questions

Consonant Sounds, Debate, Blog Making

UNIT – IV

Travel and Tourism

Ten Reasons Why Travel is a Waste of Time, Atithi Devo Bhava

Syllables, Word Stress Rules, Group Discussion

UNIT – V

Getting Job Ready

Boeing, Arvind Mills

Presentation Skills, Writing Emails, Creativity: Thinking and Writing

UNIT – VI

Getting Job Ready

Toyota Production System, Preparing for the Interviews

Types of Interviews, Mock Interviews, Personality Development.

TEXT BOOKS:

1. Mindscapes: English for Technologists and Engineers, Paper Back 2012 by Anna University.

UNIT -I

Matrices: Elementary row transformations – Rank – Echelon form, normal – Consistency and Inconsistency of System of Homogenous and Non Homogeneous equations –Eigen values, Eigen vectors – (Excluding proofs of Properties). Cayley – Hamilton Theorem(Excluding proof) – Inverse and powers of a matrices by Cayley-Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix.

UNIT-2

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta method - Milne's Predictor-Corrector Method.

UNIT-3

Fourier series:Determination of Fourier coefficients- Fourier series of Even and odd functions- Fourier series in an arbitrary interval-Even and odd periodic continuation- Half range Fourier sine and cosine expansions.

UNIT-4

Fourier integral theorem (statement only) – Fourier sine and cosine integrals. Fourier transform- Fourier sine and cosine transforms- Properties- Inverse transforms- Finite Fourier transforms.

UNIT-5

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions-Method of separation of variables-Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace equation under initial and boundary conditions.

UNIT-6

z-transform –inverse z-transform-Properties-Damping rule –shifting rule- Initial and final value theorems. Convolution theorem-Solution of difference equations by transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
3. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
4. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
5. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

REFERENCES:

1. Numerical Methods for Scientific and Engineering Communication, M.K.Jain,S.R.K. Iyengar& R.K.Jain, New Age international Publishers.
2. Mathematical Methods –Pal –Oxford.
3. Introduction to Numerical Analysis –S.S.Sastry Printice Hall of India
4. Mathematical Methods, S.K.V.S.Sri Ramachary, M. Bhujanga Rao, P.B.Bhaskar Rao & P.S.Subramanyam, BS Publications..

Unit –I :- Water

Types Of Impurities In Water, Hardness Of Water And Its Units, Disadvantages Of Hard Water. Estimation Of Hardness By Edta Method. Analysis Of Water- Dissolved Oxygen. Problems On Hardness Of Water. Water Treatment For Domestic Purpose. Sterilisation:- Chlorination, Bleaching Powder, Ozonization. Water For Industrial Purpose:-For Steam Generation, Boilen Troubles – Carry Over (Priming & Foaming) Boiler Coreriosion – Scales And Sludges, Caustic Emfrittment. Water Treatment :-Internal Treatment :- Colloidal Phospate, Calgon, Carlronatic, Sodium Aluminates Treatment. External Treatment :- Ion – Exchange And Permutit Process Demineralisation Of Brakish Water – Reverse Osmosis And Electrodialysis.

Unit –II :- Polymers

Basic Concepts Of Polymerisation, Types Of Polymerisation Addition And Condensation Polymerisation. Plastomers :- Thermosetting And Therimoplastics Compasiti On Properties And Engineering Applications Of Pvc, Teflon, Bakelite And Nylons. Rubber – Processing Of Natural Rubber And Compounding Elastomers – Unas, Buna N, Polynmethane Rubber, Polysulphide Rubber. Conducting Polymers; Synthesis And Applications Of Polyacetylcnc And Polyaniline. Liquid Crystals Definition, Properties, Suitable Examples And Engineering Applications.

Unit – III :-Electrochemistry

Electrochemical Cells :- Measurement Of Emf, Standard Electrode Potential, Concentration Cells, Batteries (Ni-Cell), Lithium Batteries. Fuel Cells: (Hydrogen Oxygen Fuel Cell Adn Methanol Fuel Cell. Insulators :- Definition, Properties And Characteristics Of Insulating Materials, Engineering Applications. Corrosion:- Introduction, Type Of Corrosion (Dry Corrosion (Direct Chemical Attack), Hlet Corrosion, Theorics Of Corresion. And Mechanism, Electrochemical Theory Of Corrosion. Galranic Series, Galronic Corrosion Concentration Cell Corrosion, Oxygen Absorption Type. Factors Influencing Corrosion – Control Of Corrosion- Cathodic Protection. (Sacrificial Anode And Impressed Current), Inhilitors (Anodic And Cathodic), Electroplating And Electrolese Plating.

Unit – IV:- Nano Materials

Definition, Properities And Applications; Explosives And Propellants : Explosives, Classification, Precantions During Storage, Blasting Fuses, Important Explosives Rocket Propellants, Classification Of Propellants. Lubricants : - Principlesa And Function Of Lubricants – Classification And Properties Of Lubricants – Viscosity, Flash And Fire Points, Cloud And Pour Points, Aniline Point, Neutralisation Number And Mechanical Strength.

Unit –V:- Fuels And Combustion

Definition And Classification Of Fuels. Solid Liquid And Gaseous Fuels, Characteristics Of A Good Fuel. Metallergical Coke – Characteristics And Manufacture (Otto – Halfmann). Petroleum: Refining Of Petroleum, Gasoline – Octane Number, Diesel -Cetane Number. Petroleum – Refining – Synthetic Petrol. Calorific Value And Its Determination (Bomb Calorimeter – Junkers Gas Calorimeter. Combustion: Flue Gas Analysis By Orsats Apparatus.

Unit –VI:- Chemistry Of Engineering Materials

Cement : Composition Of Portland Cement, Classification, Preparation (Dry And Wet Processes), Setting And Handling Refractories :- Definition, Classification With Examples Criteria Of A Good Refractory Material; Causes For The Failure Of A Refractory Material Carbon Clusters: - Fullerenes And Carbon Nano Tubes.

UNIT I

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

UNIT II

Function Over Loading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes.

UNIT III

Review of basic data structures- The list ADT, Stack ADT, Queue ADT, Implementation using template classes in C++. Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

UNIT IV

Dictionaries, linear list representation, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT V

Binary Search Trees, Definition, ADT, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching

UNIT VI

Introduction to Red –Black trees ,Operations – Searching, insertion and deletion, B-Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees. Standard Tries, Suffix Tries, Compressed Tries.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.

REFERENCES :

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd.,Second Edition.
2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

UNIT-I Binary Systems :

Binary Systems Introduction of Digital Computers and Digital Systems Binary numbers Base Conversion Complements R's Complement (R-1)'s Complement Binary Codes Decimal Codes Error Detection codes Reflected Code

UNIT-II Binary Logic And Boolean Algebra

Binary logic Logic Gates Postulates of Boolean algebra Two value Boolean algebra Basic theorems of Boolean algebra De-Morgan's Theorems Boolean functions Boolean forms

UNIT-III Boolean Function Implementation

Need for simplification K – Map method 2 – Variable K – map 3 – Variable K – map 4 – variable K – map K – Map using Don't care condition Universal Gates NAND Gate NOR Gate NAND Implementation NOR Implementation

UNIT-IV Basic Combinational Logic

Design procedure of combinational logic Adder ,Half Adder ,Full Adder ,Subtractor ,Half Subtractor ,Full Subtractor Code Conversion BCD – Excess-3 conversion .

UNIT-V Combinational Logic Using MSI And LSI

Binary Parallel Adder ,Magnitude Comparator ,2 Input Comparator ,Decoder ,Encoder ,Multiplexer ,Demultiplexers

UNIT-VI SEQUENTIAL CIRCUITS: Classification of sequential circuits, Basic Flip-Flops, Excitation and Characteristic Tables.

TEXTBOOKS:

1. Switching & Finite Automata theory- Zvi Kohavi, TMH, 2nd Edition.
2. Digital Design-Morris Mano, PHI, 3rd Edition, 2006.
3. Switching Theory and Logic design-A. Anand Kumar, 2008.

REFERENCES:

1. An Engineering Approach to Digital Design-Fletcher, PHI.
2. Fundamentals of Logic Design-Charles H. Roth. 5th Edition, 2004, Thomson publications.
3. Digital Logic Applications and Design-John M. Yarbrough, 2006, Thomson Publications

B.Tech II Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Probability & Statistics	4	1	-	4
2.		Operating Systems	4	1	-	4
3.		Object Oriented Programming through JAVA	4	1	-	4
4.		Computer Organisation	4	1	-	4
5.		Basic Electrical and Electronics Engineering	4	1	-	4
6.		Choice Based Credit Courses (For non CSE students) 1. Data Structures 2.Object Oriented Programming 3.Operating Systems	4	1	-	4
7.		Operating Systems & Java Programming Lab	-	-	3	2
8.		Electrical and Electronics Lab	-	-	3	2
9.		Human Values and Professional Ethics	2			
		TOTAL	26	6	6	28

L – Lecture, T – Tutorial, P – Practical

UNIT – I

Probability: Sample Space and events – Probability – The axioms of Probability – Some Elementary theorems – Conditional Probability – Baye's theorem.

UNIT – II

Random Variables: Discrete and continuous - Distribution function and its Properties – Density and its properties. Theoretical distributions: Binomial, poisson and Normal distributions – Related properties – Fitting distributions.

UNIT – III

Sampling distributions : Population and samples – Sampling distribution of mean (known and unknown) Estimation: Point estimation – Interval estimation – Bayesian estimation.

UNIT – IV

Tests of Hypothesis – Hypothesis concerning Means and Proportions – One tail and two tail tests – Type I and Type II errors. Tests of significance – Student's t –test, F – test, χ^2 test – Goodness of fit – Contingency test.

UNIT – V

Analysis & Variance : Some general principles – Completely Randomized Design (CRD), Latin Square Design (LSD) and their applications – ANOVA for one way and two way classification.

UNIT – VI

Statistical Quality Control: Concept of quality of manufacturers product – Defects & defectives, causes of variation – Random & assignable – The principle of Sheward Control Chart – Control charts for measurements & attributes P -Chart, C-Chart, X- Chart and R-Chart.

TEXT BOOKS:

- 1) Probability and Statistics for Engineers by Richard A Johnson
- 2) Probability & Statistics for Engineers by R.A.Johnson & C.B.Gupta, Pearson Education 2006.
- 3) Probability & Statistics by T.K.V. Iyengar, B. Krishna Gandhi and others, S.Chand and company.

REFERENCES:

- 1) A Text book of Probability and Statistics by Dr. Shahnaz Bathul.
- 2) Fundamental Mathematical Statistics by S.C. Guptha and V.K. Kapoor – S. Chand Co

UNIT I: Introduction - what operating systems do, Operating systems structure, process management, memory management, protection and security, distributed systems, special purpose systems System structure - operating system services, systems calls, types of system calls, system programs, operating system structure, operating systems generation, system boot.

UNIT II: Process concepts – overview, process scheduling, operations on process, inter-process communication Multithread Programming – overview, multithreading models, thread libraries

Process scheduling – basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation

UNIT III: Concurrency - Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors

Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

UNIT IV: Memory Management Strategies - Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, Virtual memory management – background, demand paging, copy-on-write, page replacement algorithms, Thrashing.

UNIT V: File system – file concept, Access Methods, Directory structure, File system mounting, protection. File System implementation - File system structure, file system implementation, directory implementation, allocation methods, free-space management, Recovery.

UNIT VI: Secondary-storage structure - overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage devices-removable disks, tapes, future technology, performance issues.

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.

REFERENCES:

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole, Second Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
8. Operating Systems, R.Elmasri, A.G.Carrick and D.Levine, Mc Graw Hill

UNIT I Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, expressions, type conversion and casting, enumerated types, control flow-conditional statements, break and continue, simple java program, arrays. OOP concepts, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection, Strings, string functions.

UNIT II Inheritance –Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

UNIT III Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. **Files** – streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io. **Networking in Java** – Introduction, Manipulating URLs, Ex. Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagrams, Using java.net.

UNIT IV Exception handling – benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions. **Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

UNIT V Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT VI GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, JPanel, A simple swing application, swing components- JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, capabilities –color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

TEXT BOOKS

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

REFERENCES

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

UNIT I:

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers. **DATA REPRESENTATION:** Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT II:

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. **BASIC COMPUTER ORGANIZATION AND DESIGN:**

Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt. **CENTRAL PROCESSING UNIT:** Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Reduced Instruction set computer.

UNIT III:

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit, Hard wired control, Micro programmed control. **COMPUTER ARITHMETIC :** Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations, Decimal Arithmetic unit .

UNIT IV:

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations, Virtual memories, secondary storage, Introduction to RAID.

UNIT-V:

PIPELINE AND VECTOR PROCESSING: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

UNIT VI:

MULTI PROCESSORS: Characteristics of Multi Processors, Inter Connection Structures, Inter Processor Arbitration, Inter Processor Communication & Synchronization, Cache Coherence

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

UNIT – I

Electrical DC Circuits: Basic definitions (electrical conductor, insulator, semiconductor, electrical circuit, electric current, electric potential, EMF and electric potential difference) - Types of elements(active and passive elements)- Ohm's Law and its limitations-electric power-electrical energy- Kirchhoff's Laws- Resistances in series- Resistances in parallel- Star to delta and delta to star transformations.

UNIT – II : DC Machines

DC-Generators: Working Principle and construction of DC Generator– Generated emf equation – types of DC Generators-simple problems regarding EMF.

DC Motors : Working Principle of DC Motor-types of DC Motors -back emf -torque equation –speed control of DC Shunt Motor – applications of DC machines -losses in DC machines- Swinburne's test and efficiency calculation –simple problems.

UNIT - III

Transformers : Principle of operation of single phase transformers –Constructional features –Theory of an Ideal Transformer- EMF equation –Practical Transformer on no load and load–Equivalent circuit-Impedance Ratio-Shifting of Impedances – losses- regulation -OC & SC test- efficiency –simple problems.

UNIT - IV

Electrical Instruments : Introduction-Types of electrical instruments –Principle of Operation of indicating instruments– Essentials of Indicating Instruments-Deflecting Torque-Controlling Torque –Damping Torque-PMMC and Moving Iron Instruments (Operation and Construction only).

UNIT - V

Diode and its Characteristics : Formation of n- type and p-type semiconductor –Construction of P-n junction diode, symbol - V-I Characteristics- Diode Applications-Rectifiers – Half wave-Full wave-mid point and bridge type-simple Problems.

UNIT - VI

Transformers and CRO : Formation of PNP and NPN transistors – CE configuration of NPN and PNP transistors- applications -Transistor as an amplifier-SCR characteristics and applications- construction and Principle of CRO(operation only)-Applications.

TEXT BOOKS:

1. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.
2. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

REFERENCES:

1. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.
2. Electronics and Devices by salivahan, TMH Publications

UNIT I

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

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Dictionaries, linear list representation, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

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UNIT I: Introduction - what operating systems do, Operating systems structure, process management, memory management, protection and security, distributed systems, special purpose systems System structure - operating system services, systems calls, types of system calls, system programs, operating system structure, operating systems generation, system boot.

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Process scheduling – basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation

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2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole, Second Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
8. Operating Systems, R.Elmasri, A.G.Carrick and D.Levine, Mc Graw Hill

B.Tech II Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Managerial Economics and Financial Analysis	4	1	-	4
2.		Unix & Shell Programming	4	1	-	4
3.		Database Management Systems	4	1	-	4
4.		Mathematical Foundations of Computer Science	4	1	-	4
5.		Formal Languages and Automate Theory	4	1	-	4
6.		Web Technologies	4	1	-	4
7.		Database Management Systems Lab	-	-	3	2
8.		Web Technologies Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical;

UNIT I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand determinants, Law of Demand and its exceptions.

UNIT II

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT III

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VI

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.Dwivedi:ManagerialEconomics, 6th Ed., Vikas.

UNIT I

Introduction: Why Unix?, Computer System, The Unix Environment, Unix structure, Accessing Unix, Common commands: date, cal, who, passwd, echo, man, lpr. Other useful commands: tty, clear, sty, script, uname, bc, tar, gzip, cpio, finger, arp, ftp, telnet, rlogin. Vi editor: Editor concepts, The vi editor, Modes, Commands.

UNIT II

File Systems: File Names, File Types, Regular Files, Directories, File System Implementation, Operations unique to regular files, Operations unique to directories, Operations common to both.

Security & File Permissions: users and groups, security levels, changing permissions, user masks, changing ownership and group.

UNIT III

Introduction to Shells: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

UNIT IV

Grep : Operation, grep Family, Searching for File Content.

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep.

UNIT V

Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT VI

Korn shell Advanced Programming: Variable evaluation and substitution, string manipulation, here document, functions, arrays, signals, built-in commands, scripting techniques, shell environment and script, script examples.

TEXT BOOKS:

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition

UNIT I

Database System Applications, database System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Database Languages – DDL – DML – Database Access for applications Programs – Database Users and Administrator – Transaction Management – Database System Structure – Storage Manager – the Query Processor-Application Architectures- History of Data base Systems. Data base design and ER diagrams – Beyond ER Design- Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Conceptual Design with the ER Model.

UNIT II

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical database Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT III

The Form of a Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators – NULL values – Comparison using Null values – Logical connectivities – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL, Triggers and Active Data bases.

UNIT IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problems related to decomposition – Functional dependencies-reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT V

Overview Of Transaction Management : The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Transaction Support in SQL, Introduction to crash recovery, Concurrency Control: 2PL,serializabilityand recoverability, Introduction Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency control without locking.

UNIT VI

Data on External Storage – File Organizations and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – The Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files of Records, Page Formats, record Formats.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.
3. Introduction to Database Systems, C.J.Date Pearson Education

UNIT-I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence, implication, Normal forms.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Quantifiers, Universal Quantifiers, Existential Quantifiers, Automatic Theorem Proving.

UNIT-II

Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Hasse diagram. Lattices and its Properties.

Functions: Basic Concepts of function & its types, Composition of functions, Inverse Function, recursive Functions, Pigeon hole principles and its application.

UNIT-III

Algebraic structures: Algebraic systems with examples and general properties, semi groups and monoids, groups & its types, Sub groups, homomorphism, Isomorphism.

UNIT-IV

Elementary Combinatory: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial and Multinomial theorems, the principles of Inclusion –Exclusion.

UNIT-V

Recurrence Relation: Generating Functions, Function of Sequences ,Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions. Characteristics roots solution of In homogeneous Recurrence Relation.

UNIT-VI

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts of Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Euler's formula & its applications, Chromatic Numbers, Four color problem.

TEXT BOOKS:

1. Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar .P, TMH.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker Prentice Hall.
3. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi. Pearson Education

REFERENCES:

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier
2. Discrete Mathematical Structures, Bernand Kolman, Roberty C. Busby, Sharn Cutter Ross, Pearson Education/PHI.
3. Discrete Mathematical structures Theory and application-Malik & Sen
4. Discrete Mathematics for Computer science, Garry Haggard and others, Thomson.
5. Mathematical foundations of computer science Dr D.S.Chandrasekharaiaha Prism books Pvt Ltd.
6. Logic and Discrete Mathematics, Grass Man & Trembley, Person Education

UNIT I

Introduction to Web Technologies: Introduction to Web servers like Apache 1.1, IIS XAMPP(Bundle Server), WAMP(Bundle Server), Handling HTTP Request and Response, installations of above servers.

UNIT II Introduction to PHP: The problem with other Technologies (Servelets and JSP), Downloading, installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page.
Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

UNIT III

Overview of Classes, Objects, and Interfaces: Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

UNIT IV

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

UNIT V

Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

UNIT VI

PHP and Database Access: Basic Database Concepts, Connecting to a MYSQL database, Retrieving and Displaying results, Modifying, Updating and Deleting data. MVC architecture.

PHP and Other Web Technologies: PHP and XML, PHP and AJAX

TEXT BOOKS:

1. Beginning PHP and MySQL, 3rd Edition , Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

REFERENCES:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
4. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
5. PHP Programming solutions, V.Vaswani, TMH

B.Tech III Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Engineering	4	1	-	4
2.		Design and Analysis of Algorithms	4	1	-	4
3.		Computer Networks	4	1	-	4
4.		Environmental Science	4	1	-	4
5.		Data Warehousing and Data Mining	4	1	-	4
6.		Microprocessors and Micro Controllers	4	1	-	4
7.		Data Warehousing and Data Mining Lab	-	-	3	2
8.		Microprocessors and Micro Controllers Lab	-	-	3	2
9.		Advanced Communications Skills Practice			3	
		TOTAL	24	6	6	28

L – Lecture, T – Tutorial, P – Practical

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. **A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT II

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process. **Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT III

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. **System models:** Context Models, Behavioral models, Data models, Object models.

UNIT IV

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns.

UNIT V

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

UNIT VI

Metrics for Process and Products: Software Quality, Software Measurement, Metrics for software quality.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

REFERENCES:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies

UNIT I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

UNIT II

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi connected components.

UNIT III

Divide and conquer: General method , applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT IV

Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT V

Dynamic Programming: General method, applications- 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT VI

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring. Branch and Bound: General method, applications - Travelling sales person problem, LC Branch and Bound solution, FIFO Branch and Bound solution.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rjasekharam, Galgotia publications pvt. Ltd.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John wiley and sons.

REFERENCES:

1. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education

UNIT I: Introduction: Network Hardware, Network Software, References Models. The Physical Layer: Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching

UNIT II: The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols.

UNIT III: The Medium Access Control Sublayer: Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure.

UNIT IV: The Network Layer: Network Layer Design Issues, Routing Algorithms(Shortest path, Flooding, Distance Vector, Link state and Hierarchical routing, Broad cast routing , Multicast routing), Congestion Control Algorithms, Internetworking.

UNIT V: The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP.

UNIT VI: The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web. Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

REFERENCES:

1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.

2. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.

3. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.

4. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.

5. Computer and Communication Networks, Nader F. Mir, Pearson Education

6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.

7. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group

UNIT-I

Introduction of Environmental Studies-Natural Resources: Definition, The Global environment and its segments; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere Scope and Importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources – Natural resources and associated problems – Forest resources: Introduction –deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources :Introduction– Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Introduction, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT – II

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: 1. Forest ecosystem. 2. Grassland ecosystem. 3. Desert ecosystem. 4. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III

Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. – Biogeographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – IV

Environmental Pollution: Definition, Cause, effects and control measures of :1. Air pollution. 2. Water pollution 3. Soil pollution 4. Marine pollution 5. Noise pollution 6. Thermal pollution 7 Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-V

Social Issues and the Environment: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management –Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. –Consumerism and waste products. –Environment Protection Act. –Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-VI

Human Population and the Environment: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. ,Infectious diseases,-Tuber colossi,cancer,Water Borne Diseases-Malaria,Diheria -Women and Child Welfare. - Role of information Technology in Environment and human health. -Case Studies.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. A Basic Course in environmental Studies by S.Deswal and A.Deswal ,Dhanpat Rai & Co

UNIT – I Introduction:What Motivated Data Mining? Why is it Important?; What is Data Mining?; Data Mining-On What Kind of Data?; Data Mining Functionalities: What kinds of Data Can be Mined?; Are all of Patterns Interesting?; Classification of Data Mining Systems; Data Mining task primitives;

Data Warehouse and OLAP Technology:What is a Data Warehouse?; A Multidimensional Data Model: From Tables and Spreadsheet to Data Cubes,Stars,Snowflakes and Fact constellation schemas for Multidimensional Databases, Measures: Their Categorization and Computation, Concept Hierarchies, OLAP operations in the Multidimensional Data Model; Data Warehouse Architecture: Steps for the Design and Construction of Data Warehouses, A three-tier Architecture.

UNIT-II Data Preprocessing: Why preprocess the data; Descriptive Data Summarization: Measuring the Central Tendency, Measuring the Dispersion of Data, Graphic Displays of Basic Descriptive Data Summaries; Data Cleaning: Missing values, Noisy Data Cleaning as a process; Data Integration and Transformation: Data Integration, Data Transformation, Data Reduction: Data Cube aggregation, attribute subset selection; Dimensionality Reduction, Numerosity Reduction;

UNIT-III Mining Frequent patterns, Associations, and Correlations:Basic Concepts; Efficient and Scalable Frequent Itemset Mining methods: The Apriori Algorithm, Generating Association Rules from Frequent Itemsets, Improving Efficiency of Apriori, Mining Frequent Itemsets without Candidate Generation; Mining various kinds of Association Rules: Mining multilevel & multi-dimensional association rules; From Association Mining to Correlation Analysis: Strong Rules are not necessarily Interesting, From Association analysis to Correlation analysis;

UNIT-IV Classification I:Overview of Classification and Prediction: What is Classification, What is prediction?; Issues Regarding Classification and Prediction: Preparing data for Classification and Prediction, Comparing Classification and Prediction Methods; Bayesian Classification: Bayes'theorem, Naïve Bayesian Classification; Classification by Decision Tree Induction: Decision Tree Induction,Attribute Selection Measures,Tree Pruning, Scalability and Decision Tree Induction; Rule-Based Classification: Using IF-THEN rules for Classification, Rule Extraction from Decision Tree, Rule Induction using a Sequential Covering Algorithm; Classification by Back propagation: A Multilayer Feed-Forward Neural Network, Defining Network Topology, Backpropagation;

UNIT-V Classification II and Prediction:Support Vector Machines: The Case when the Data are Linearly Separable, The Case when the Data are Linearly Inseparable; Lazy Learners: k-Nearest-Neighbor Classifiers, Case-Based Reasoning; Prediction:Linear Regression, Nonlinear Regression; Accuracy and Error Measures: Classifier Accuracy Measures, Predictor Error Measures; Evaluating the Accuracy of a Classifier or Predictor: Holdout Method and Random subsampling, Cross validation, Bootstrap;

UNIT-VI Cluster Analysis:Overview of Cluster Analysis; Types of data in Cluster Analysis: Interval-Scaled Variables, Binary Variables, Categorical, Ordinal, and Ratio-Scaled variables, Variables of Mixed Types; A Categorization of Major Clustering Methods; Partitioning Methods: Classical Partitioning Methods: k-Means and k-Medoids, Partitioning Methods in Large Databases: From k-Medoids to CLARANS; Hierarchical Methods: Agglomerative and Divisive Hierarchical Clustering, BIRCH, ROCK; Density-Based Methods: DBSCAN; Grid-Based Methods: STING; Model-Based Clustering Methods: Expectation-Maximization;

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India, second Edition.

REFERENCES:

1. Data Mining Introductory and advanced topics–MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION

UNIT-I

8086 MICROPROCESSOR: Evaluation of microprocessors. Overview of 8085. Register organization of 8086, architecture, signal description of 8086, physical memory organization, general bus operations, I/O addressing capability, special processor activities, 8086-Minimum mode and maximum mode of operation, Timing diagram.

UNIT-II

8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES: Addressing modes of 8086, Instruction set of 8086, Assembler Directives and operators

UNIT-III

8086 ASSEMBLY LANGUAGE PROGRAMMING: 8086 Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-IV

PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING: Memory interfacing to 8086 (static RAM and EPROM). 8255 PPI-various modes of operation and interfacing to 8086. D/A and A/D converter interfacing, Stepper motor interfacing. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. 8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

UNIT-V

8051 MICROCONTROLLER: Architecture of 8051 microcontroller. Pin Diagram of 8051, and external memories, counters and timers, serial communication, interrupts.

UNIT-VI

8051 ASSEMBLY LANGUAGE PROGRAMMING: Instruction set of 8051, Addressing modes of 8051, Assembly Language Programming examples using 8051. Interfacing to LCD, Keyboard, ADC & DAC.

TEXT BOOKS:

1. Microprocessor Architecture, Programming and Applications with 8085 By Ramesh S Gaonkar.
2. Advanced microprocessor and peripherals-A.K. Ray and K.M. Bhurchandi, 2nd edition, TMH, 2000.
3. 8051 microcontroller and embedded systems by mazidi and mazidi, pearson education 2000.

REFERENCES:

1. Microprocessors Interfacing-Douglas V. Hall, Revised 2nd edition, 2007.
2. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
3. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by Subrata Ghoshal

B.Tech III Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Object Oriented Analysis and Design	4	1	-	4
2.		Compiler Design	4	1	-	4
3.		Mobile Application Development	4	1	-	4
4.		Advanced Computer Networks	4	1	-	4
5.		Artificial Intelligence	4	1	-	4
6.		Choice Based Credit Courses (For Non CSE students) 1. Web Technologies 2. Principles of Database Systems 3. Unix & Shell Programming	4	1	-	4
7.		UML & Compiler Design Lab	-	-	3	2
8.		Computer Networks & Mobile Application Development Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

UNIT – I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, Conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT - III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-: Interactions, Interaction diagrams. Use cases, Use case Diagrams, Activity Diagrams.

UNIT - IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-V

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT - VI

Case Study: The Unified Library application, ATM application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEYDreamtech India Pvt. Ltd.
3. AtulKahate: Object Oriented Analysis & Design, The McGraw – Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATAMcGrawHill
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd

UNIT-I

Overview of compilation: Phases of compilation, Lexical analysis, regular Grammar & regular Expressions for common Programming language features, Pass & Phases translation, interpretation, bootstrapping, data structures in compilation, LEX

UNIT-II

Parsing: CFG, Top down parsing , backtracking, recursive descent parsing ,Preprocessing steps required for predictive parsing, , Predictive parsing, LL(1).

UNIT-III

Bottom up Parsing : Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC.

UNIT-IV

Semantic analysis: Intermediate forms of source Programs-abstract syntax tree, polish notation and Three address code. Attributed grammars, Syntax directed translation, Conversion of popular Programming language Constructs into Intermediate code forms, Type checker.

UNIT-V

Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of space information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT-VI

Code optimization : Consideration for Optimization, Scope of Optimization, local Optimization, loop Optimization, global Optimization, machine dependent code Optimization . Object code forms, register allocation and assignment generic code generation algorithms , DAG for register allocation. Data flow analysis.

TEXT BOOKS:

1. Principles of compiler design –A.V.Aho.J.D.Ullman;Person Education.
2. Modern Compiler Implementation in C-Andrew N.Appel,Cambridge University Press.

REFERENCES :

1. Lex&yacc-John R.Levine, Tony Mason,Doug Brown, O'reilly
2. Modern Compiler Design-Dick Grune, Henry E.Bal, Caryl T.H.Jacobs, Wiley dreamtech.
3. Engineering a Compiler –Cooper & Linda, Elsevier.
4. Compiler Construction , Loudon, Thomson

Unit I**J2ME Overview**

Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

Unit II**J2ME Architecture and Development Environment**

J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

Unit III

Commands, Items, and Event Processing

J2ME User Interfaces, Display Class, the Palm OS Emulator, Command Class, Item Class, Exception Handling High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

Unit IV**Record Management System:**

Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions

Unit V

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data from a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWS

Unit VI**Generic Connection Framework**

The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.
2. Programming for Mobile and Remote Computers, G.T.Thampi, dreamtech press.

REFERENCE BOOKS:

1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, 1st edition, J.Knudsen, Pearson.

UNIT –I**REVIEW OF COMPUTER NETWORKS AND THE INTERNET:**

What is Internet, The network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet – Switched Networks, History of Computer Networking and the Internet. Foundation of Networking Protocols: 5 Layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal – Sized Packet Model: ATM

UNIT –II

NETWORKING DEVICES: Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure.

ROUTING AND INTERNETWORKING:

Network – Layer Routing, Least Cost – Path algorithm, Non- Least-Cost – path algorithms, Intradomain Routing protocols, Interdomain Routing Protocols, Congestion Control at Network Layer.

UNIT – III

LOGICAL ADDRESSING: IPV4 Address, IPV6 Address –

INTERNET PROTOCOL: Internetworking, IPV4, IPV6, Transition from IPV4 to IPV6

MULTICASTING TECHNIQUES AND PROTOCOLS: Basic Definitions and Techniques, Intra domain Multicast Protocols, Intra domain Multicast protocols, Node – Level Multicast algorithms.

UNIT-IV

SCTP: SCTP Services, features, packet format, SCTP Association, Flow control, error control.

WIRELESS NETWORKS AND MOBILE IP : Infrastructure of wireless Networks, wireless LAN Technologies, IEEE 802.11 Wireless standard, cellular Networks, Mobile IP, Wireless Mesh Networks (WMNS)

UNIT – V

VPNS, TUNNELING AND OVERLAY NETWORKS: Virtual private Networks (VPNS), Multiprotocol Label Switching (MPLS)

OVERLAY NETWORKS –

VOIP AND MULTIMEDIA NETWORKING : Overview of IP Telephony, V0IP signaling protocols, Real – Time media Transport protocols, Distributed Multimedia Networking, Stream control Transmission protocol

UNIT –VI**EMERGING TRENDS IN COMPUTER NETWORKS:**

MOTIVATION FOR MOBILE COMPUTING: Protocol stack issues in mobile computing environment, mobility issues in mobile computing, data dissemination security issues mobile networks.

MOBILE ADHOC NETWORKS: Application of Adhoc networks, Challenges and issues in MANETS, MAC layer issues, ad-hoc network security

Text Books:

1. Computer Networking : A Top-down approach featuring the Internet, James F. kurose, keith W. Ross, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, Nader F. Mir, peason, Education, 2007
3. Computer Networks, Mayank Dave, Cengage

UNIT- I

What is Artificial Intelligence? - The AI problems, the underlying Assumption, What is an AI Technique? The level of the model, Criteria for success, Problems, problem spaces, and search - defining the problem as a state space search, production systems, problem characteristics, production system characteristics, issues in the design of search programs.

UNIT - II

HEURISTIC SEARCH TECHNIQUES - Generate and test- travelling sales man problem, Hill climbing, Best first search, problem reduction, constraint satisfaction, Mean ends analysis 35

UNIT - III

KNOWLEDGE REPRESENTATION - Representations and mappings, approaches to knowledge representation, The Frame Problem. Using Predicate logic - Representing simple facts in logic, Representing Instance and Isa relationships, Resolution.

UNIT-IV

REPRESENTING KNOWLEDGE USING RULES - Procedural versus declarative knowledge, logic programming, forward versus backward reasoning, matching.

UNIT – V

WEAK SLOT AND FILLER STRUCTURES - Semantic nets, Frames. STRONG SLOT AND FILLER STRUCTURES - Conceptual dependency, scripts, CYC GAME PLAYING - MIN MAX search procedure, Adding Alpha Beta cutoffs.

UNIT - VI

Learning – Learning from Observations – Forms – inductive - Learning Decision Trees, Ensemble Learning, Knowledge in Learning – A Logical Formulation of Learning, Knowledge in Learning, EBL, Learning Using Relevance information, Inductive Logic Learning, Passive Active and Generalization in Reinforcement Learning. case studies : MYCIN, PROSPECTOR, XCON.

TEXT BOOKS:

1. Elaine Richie Kevin Knight, "Artificial Intelligence", TMH.
2. Stuart Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", Pearson Education

UNIT I

Introduction to Web Technologies: Introduction to Web servers like Apache 1.1, IIS XAMPP(Bundle Server), WAMP(Bundle Server), Handling HTTP Request and Response, installations of above servers.

UNIT II Introduction to PHP: The problem with other Technologies (Servelets and JSP), Downloading, installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page.
Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

UNIT III

Overview of Classes, Objects, and Interfaces: Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

UNIT IV

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

UNIT V

Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

UNIT VI

PHP and Database Access: Basic Database Concepts, Connecting to a MYSQL database, Retrieving and Displaying results, Modifying, Updating and Deleting data. MVC architecture.

PHP and Other Web Technologies: PHP and XML, PHP and AJAX

TEXT BOOKS:

3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech.).
4. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

REFERENCES:

6. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
7. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
8. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
9. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
10. PHP Programming solutions, V.Vaswani, TMH

UNIT I

Database System Applications, database System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Database Languages – DDL – DML – Database Access for applications Programs – Database Users and Administrator – Transaction Management – Database System Structure – Storage Manager – the Query Processor-Application Architectures- History of Data base Systems. Data base design and ER diagrams – Beyond ER Design- Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Conceptual Design with the ER Model.

UNIT II

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical database Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT III

The Form of a Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators – NULL values – Comparison using Null values – Logical connectivities – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values –Triggers.

UNIT IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problems related to decomposition – Functional dependencies-reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Multi valued Dependencies – FORTH Normal Form.

UNIT V

Overview Of Transaction Management : The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Concurrency Control: 2PL,serializabilityand recoverability, Dealing with Deadlocks.

UNIT VI

Data on External Storage – File Organizations and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – RAID, Files of Records, Page Formats, record Formats.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & CarlosCoronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.
3. Introduction to Database Systems, C.J.Date Pearson Education

UNIT I

Introduction: Why Unix?, Computer System, The Unix Environment, Unix structure, Accessing Unix, Common commands: date, cal, who, passwd, echo, man, lpr. Other useful commands: tty, clear, sty, script, uname, bc, tar, gzip, cpio, finger, arp, ftp, telnet, rlogin. Vi editor: Editor concepts, The vi editor, Modes, Commands.

UNIT II

File Systems: File Names, File Types, Regular Files, Directories, File System Implementation, Operations unique to regular files, Operations unique to directories, Operations common to both.

Security & File Permissions: users and groups, security levels, changing permissions, user masks, changing ownership and group.

UNIT III

Introduction to Shells: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

UNIT IV

Grep : Operation, grep Family, Searching for File Content.

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep.

UNIT V

Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT VI

Korn shell Advanced Programming: Variable evaluation and substitution, string manipulation, here document, functions, arrays, signals, built-in commands, scripting techniques, shell environment and script, script examples.

TEXT BOOKS:

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition

B.Tech IV Year I Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Testing Methodologies	4	1	-	4
2.		Big Data Analytics	4	1	-	4
3.		Management Science	4	1	-	4
4.		Cloud Computing	4	1	-	4
5.		Choice Based Credit Courses (For CSE Students) 1. Grid and cluster computing 2. Internet of Things 3. C# & .Net	4	1	-	4
6.		Choice Based Credit Courses (For CSE Students) 4. Human Computer Interaction 5. Distributed Database 6. Semantic Web & Social Networks	4	1	-	4
7.		Cloud Computing and Big Data Lab	-	-	3	2
8.		Software testing and case tools lab	-	-	3	2
		Mini Project	-	-	-	2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

UNIT - I

Testing Methodology: Introduction to software Testing, Evolution of Software Testing, Goals of Software Testing, Software testing as a Process. Software Testing Terminology, Software Testing Life Cycle. Verification & Validation: Verification and Validation Activities, Verification and its requirements, Validation.

UNIT -II

Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

UNIT- III

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - IV

Dataflow testing:-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT - V

Logic Based testing:Overview, decision tables, path expressions, kv charts, and specifications.

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.

UNIT - VI

Test Automation: Need for Automation, Categorization of Testing Tools, Selection of Testing Tools, Cost Incurred in Testing Tools, Guidelines for Automated Testing , Overview of Some Commercial Testing Tools.

TEXT BOOKS:

1. Software testing techniques - Boris Beizer, Dreamtech, second edition.
2. Software Testing Principles and Practices by NARESH CHAUHAN, OXFORD HIGHER EDUCATION, university Press.

REFERENCES:

1. Software Testing in the Real World – Edward Kit, Pearson.
2. Effective methods of Software Testing, Perry, John Wiley.
3. Art of Software Testing – Meyers, John Wiley.
4. Software testing Tools – Dr.K.V.K.K.Prasad, Dreamtech

Unit I:

Overview of Big Data, Stages of analytical evolution, State of the Practice in Analytics

Unit II:

The Data Scientist, Big Data Analytics in Industry Verticals, Data Analytics Lifecycle

Unit III:

Operationalizing Basic Data Analytic Methods Using R, Advanced Analytics - Analytics for Unstructured Data - Map Reduce and Hadoop, The Hadoop Ecosystem,

Unit IV:

In-database Analytics, Data Visualization Techniques, Stream Computing Challenges,

Unit V:

Systems architecture, Main memory data management techniques, Energy-efficient data processing

Unit VI:

Benchmarking, Security and Privacy, Failover and reliability

Text Books:

1. Bill Franks, Taming The Big Data Tidal Wave, 1st Edition, Wiley, 2012.
2. Frank J. Ohlhorst, Big Data Analytics, 1st Edition, Wiley, 2012

UNIT-I: INTRODUCTION TO MANAGEMENT: Concepts of Management – Nature, Importance and Functions of Management, Taylor’s Scientific Management Theory, Fayol’s Principles of Management, Mayo’s Hawthorne Experiment, Maslow’s Theory of Human Needs, Douglas McGregor’s Theory X and Theory Y, Herzberg’s Two-Factor Theory of Motivation

UNIT-II: BASIC ISSUES IN ORGANIZATION: Designing Organic Structures of Organization (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization, Virtual organization, Cellular organization, Team structure, Boundary less organization and Departmentation, Leadership Styles, Social responsibilities of Management

UNIT-III: OPERATIONS MANAGEMENT: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

UNIT-IV: HUMAN RESOURCES MANAGEMENT: Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT-V: PROJECT MANAGEMENT (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT-VI: WOMEN ENTREPRENEURSHIP: Scope of Entrepreneurship among women- Promotional efforts supporting Women Entrepreneurs in India – Opportunities for women entrepreneurs – Challenges/Problems of Women Entrepreneurs – Successful cases of Women Entrepreneurs.

TEXT BOOK:

1. Aryasri: Management Science, TMH, New Delhi.

REFERENCE BOOKS:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2007.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2007.
3. Thomas N.Duening& John M.Ivancevich Management—Principles and Guidelines, Biztantra,2007

UNIT-I

Introduction: What Is the Cloud? The Emergence of Cloud Computing, The Global Nature of the Cloud, Cloud-Based Service Offerings, Grid Computing or Cloud Computing?, Is the Cloud Model Reliable?, Benefits of Using a Cloud Model, What About Legal Issues When Using Cloud Models?, What Are the Key Characteristics of Cloud Computing?, Challenges for the Cloud.

The Evolution of Cloud Computing : Hardware Evolution, Internet Software Evolution, Server Virtualization.

UNIT-II

Web Services Delivered from the Cloud: Communication-as-a-Service (CaaS), Infrastructure-as-a-Service (IaaS), Monitoring-as-a-Service (MaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), **Building Cloud Networks:** The Evolution from the MSP Model to Cloud.

Computing and Software-as-a-Service, The Cloud Data Center, Collaboration, Service-Oriented Architectures as a Step Toward Cloud Computing, Basic Approach to a Data Center-Based SOA.

UNIT III

Federation, Presence, Identity, and Privacy in the Cloud: Federation in the cloud, Presence in the Cloud, Privacy and Its Relation to Cloud-Based Information Systems, Security in the Cloud: Cloud security challenges - Software- as-a-service security

UNIT IV

Common Standards in Cloud Computing: The open cloud consortium- The distributed management task force - standards for application developers - standards for messaging - standards for security

UNIT V

End-User Access to Cloud Computing: YouTube, YouTube API Overview, Zimbra, Facebook, Zoho, DimDim Collaboration, **Mobile Internet Devices and the Cloud:** Smartphone, Mobile Operating Systems for Smartphones - Mobile Platform virtualization – Collaboration applications for mobile platforms - Future trends

UNIT VI

Cloud Computing case studies: Google App Engine, Google Web Toolkit, Microsoft Azure Services Platform, Windows Live, Exchange Online, SharePoint Services, Microsoft Dynamics CRM, Amazon EC2, Amazon Simple DB, Amazon S3, Amazon Cloud Front, Amazon SQS

TEXTBOOKS:

- 1) Cloud Computing implementation, management and security by John W. Ruttinghouse, James F. Ransome. CRC Press, Taylor & Francis group, 2010.
- 2) Cloud Computing a practical approach by Anthony T. Velte, Toby J. Velte Robert Elsenpeter. Tata McGraw Hill edition, 2010

REFERENCES:

- 1) Cloud Application Architectures by George Reese. O'Reilly publishers
- 2) Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison-Wesley

UNIT I

Introduction: The different forms of computing, the strengths and weaknesses of Distributed computing, Operating system concepts relevant to distributed computing, the architecture of distributed applications. Paradigms for Distributed Applications, choosing a Paradigm for an application (trade-offs).

UNIT II

Parallel computing overview, parallel programming models and Paradigms.
Cluster computing: Introduction, Cluster Architecture, Applications of Clusters.

UNIT III

Grid Computing: Introduction, Grid Computing Anatomy – Architecture, Architecture and relationship to other Distributed Technologies, Grid computing road map.
Merging the Grid services Architecture with the Web Services Architecture.

UNIT IV

Open Grid Service Architecture: Introduction, Architecture and Goal, Sample Use cases: Commercial Data Center, National Fusion Collaboratory, Online Media and Entertainment. OGSA platform Components, Open Grid Services Infrastructure.

UNIT V

Globus GT3 Toolkit: Architecture, Programming Model.

UNIT VI

A sample implementation, High Level services, OGSI.NET Middleware Solutions.

TEXT BOOKS:

1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education, 2004.
2. High Performance Cluster Computing, Rajkumar Buyya, Pearson education.
3. Grid Computing, Joshy, Joseph and Craig Fellenstein, Pearson education, 2004.

REFERENCES:

1. Grid Computing: Making the global infrastructure a reality, Fran Berman, Geoffrey C Fox, Anthony J G Hey, Wiley India, 2010.
2. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons, 2006.
3. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media, 2008

Unit I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs
IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates

Unit II

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Unit III

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit IV

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling
Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit V

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit VI

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs

Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

TEXT BOOK:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

UNIT I

INTRODUCTION TO C#: Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II

OBJECT ORIENTED ASPECTS OF C#: Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT III

APPLICATION DEVELOPMENT ON .NET: Building Windows Applications, Accessing Data with ADO.NET.

UNIT IV

ASP.NET: Web applications and web servers, HTML form Development, Client side Scripting, GET and POST, ASP.NET application, ASP.NET namespaces, creating sample C# web Applications, architecture, Debugging and Tracing of ASP.NET

UNIT V

WEB DEVELOPMENT: Introduction to web Form controls. Building Web Services- web service namespaces, building simple web Service, WSDL, web service wire protocols, WSDL into C#.

UNIT VI

THE CLR AND THE .NET FRAMEWORK: Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.

TEXT BOOKS

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004.
2. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2002.

REFERENCES

1. Andrew Trolesen C# and the .NET Platform, Dreamtech Press, Second Edition
2. Bradley L Jones, 'Sams Teach Yourself the C# Language in 21 Days', Sams, 1st edition, 2001.
3. Andy Harris, 'Microsoft C# Programming for the Absolute Beginner', PTR publications, 2002.
4. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
5. Robinson et al, "Professional C#", 2nd ed., Wrox Press, 2002

UNIT - I

Introduction: Importance of user Interface – definition, Importance of good design. Benefits of good design. A brief history of Screen design.

UNIT – II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - III

Design process – Understanding Human interaction with computers, Importance of human characteristics in design, Human consideration in Design, Human interaction speeds.

UNIT - IV

Screen Designing: Human Considerations in Screen Design – Interface Design Goals, Screen Meaning and purpose, organizing screen elements clearly and Meaningfully, Ordering of screen data and content – Screen navigation and flow – Visually pleasing composition – Amount of information – Focus and Emphasis – Presenting information simply and meaningfully – statistical graphics – Technological consideration in interface design.

UNIT - V

Windows: Select the Proper Kinds of Windows: Window Characteristics, Components of a Window, Window Presentation Styles, Types of Windows, Window Management, Window Operations. Select the Proper Device-Based Controls: Characteristics of Device-Based Controls, Selecting the Proper Device Based Controls.

UNIT - VI

Components: Choose the Proper Screen-Based Controls – Operable Controls, Text Entry, Selection Controls, Combination Entry/selection controls, Other Operable Controls, Custom Controls, and Presentation Controls. Write Clear Text and Messages – Words, Sentences, Messages and Text, Text for Web Pages. Icons, Multimedia, Color-What Is It? Color Uses, possible problems with colors, choosing colors.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley India.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education

UNIT I

Introduction to Distributed Databases: Features of Distributed versus Centralized Databases, why distributed databases?, Distributed Database Management Systems, Review of databases, Review of computer networks.

UNIT II

Levels Of Distribution Transparency: Reference Architecture for Distributed Databases , Types of Data Fragmentation, Distribution transparency for read only applications, Distribution transparency for update applications, distributed database access primitives, Integrity Constraints in Distributed Databases.

UNIT III

Distributed Database Design: A Framework for Distributed database Design, The Design of database Fragmentation

UNIT IV

Translation of Global Queries to Fragment Queries: Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and aggregate Function Evaluation, Parametric Queries.

UNIT V

The Management of Distributed Transactions: A Framework for Transaction Management Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

UNIT VI

Concurrency Control: Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

TEXT BOOKS :

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

REFERENCES:

1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education

Unit I:

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Todays Web, The Next Generation Web

Unit II:

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit III:

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema. Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping,

Unit IV:

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base

Unit V:

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

Unit VI:

What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
Social Networks and the Semantic Web ,Peter Mika, Springer, 2007

B.Tech IV Year II Semester Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Software Project Management	4	1		4
2.		Internetworking with TCP/IP	4	1		4
3.	MOOCs-I	Massive Open Online Courses-I 4. Mongo DB 5. Ethical Hacking 6. Computer and Hacking forensics	4	-	-	4
4.	MOOCs-II	Massive Open Online Courses-II 1. Mobile and Adhoc Networks 2. Advanced Computer Architecture 3. Social Networks	4	-	-	4
5.		Project Work	-	-	-	8
6.		Seminar	-	-	-	2
7.		Comprehensive Viva-Voce	-	-	-	4
		TOTAL	16	2	-	30

L – Lecture, T – Tutorial, P – Practical

UNIT I

Conventional Software Management: The Waterfall Model, Conventional software Management Performance. Evolution of Software Economics: Software Economics, Pragmatic Software Cost Estimation.

UNIT II

Improving Software Economics: Reducing Software Product Size, Improving software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT III

Conventional and Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process. Life Cycle Phases: Engineering and Production Stages, Inception. Elaboration, Construction, Transition Phases. Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT IV

Workflows of The Process: Software Process Workflows. Iteration Workflows. Checkpoints of the Process: Major Milestones, Minor Milestones, Periodic Status Assessments. Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Iteration Planning Process. Pragmatic Planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation: Automation Building Blocks, The Project Environment.

UNIT V

Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics, Metrics Automation. Tailoring the process: Process Discriminates, Example of Small-scale project versus Large-scale project.

UNIT VI

Modern Project Profiles Next, Generation Software economics, Modern Process Transitions.

TEXT BOOKS:

1. Software Project Management, Walker Royce, 1998, PEA.

REFERENCES:

1. Software Engineering Project Management, Richard H. Thayer, 1997, IEEE Computer Society.
2. Software Engineering and Management, Shere K. D, 1998, PHI.
3. Software Project Management: A Concise Study, S. A. Kelkar, PHI.
4. Software Project Management, Second Edition, Hughes Cotterell, TMH.
5. Software Project Management from Concept to Development, Kaeron Conway, Dream Tech

Unit I: The OSI Model and the TCP/IP Protocols suite: Protocol layer, The OSI model, TCP/IP protocol suite, Addressing

Underlying Technologies: Wired local area networks, Wireless LANs, Point to point WANs, Switched WANs, Connecting devices

Introduction to Network Layer: Switching, Packet switching at network layer, Network layer services, Other network layer issues

IPv4 Address: Classful addressing, Classless addressing, Special address, NAT

Unit II: Delivery and Forwarding of IP Packets: Delivery, Forwarding, Structure of a router

Internet Protocol Version 4 (IPv4): Datagrams, Fragmentation, Options, Checksum, IP over ATM, Security, IP Package

Internet Protocol Version 6 (IPv6): Packet format, Transition from IPv4 to IPv6

Unit III: Address Resolution Protocol: Address mapping, The Arp Protocol, ATM layer, ARP packages

Internet Control Message Protocol Version 4 (ICMPv4): Messages, Debugging tools, ICMP package

Mobile IP: Addressing, Agents, Three Phases, Inefficiency in mobile IP,

Unit IV: Unicast Routing Protocols: Intra and inter domain routing, Distance vector routing, RIP, Link state routing, OSPF, Path vector routing, BGP

Multicasting and Multicast Routing Protocols: Multicast address, IGMP, Multicast routing, Routing protocols, MBONE

Unit V: Introduction to the Transport Layer: Transport layer services, Transport layer protocols

User Datagram Protocol (UDP): User datagram, UDP Applications, UDP package

Transmission Control Protocol: TCP services, TCP features, Segment, A TCP connection, State transition diagram, Window in TCP, Flow control, Error control, Congestion control, TCP timers, Options, TCP package

Unit VI Stream Control Transmission Protocol (SCTP): SCTP services, SCTP features Packet format, An SCTP association, State transition diagram, Flow control, Error control, Congestion control

HOST Configuration (DHCP): DHCP operation, Configuration, **Secure Shell (SSH)**

TEXT BOOKS:

1. TCP/IP Protocol Suite, Behrouz A. Forouzan, TMH.

REFERENCES:

1. TCP/IP, Tittel Chappell, Cengage Learning.
2. TCP/IP Illustrated, Volume 1, the Protocols, W. Richard Stevens, G. Gabrani, Pearson.
3. TCP/IP Application Layer Protocols for Embedded Systems, M. Tim Jones, Networking Series.
4. Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, 5th edition, 2006. ISBN 0,13,187671,6.
5. Internetworking With TCP/IP Volume II: Design, Implementation, and Internals (with D. Stevens), Third edition, 1999. ISBN 0,13,973843,6.
6. Internetworking With TCP/IP Volume III: Client, Server Programming and Applications, Linux/POSIX Socket Version (with D. Stevens), 2000. 0,13,032071,4.
7. Internetworking With TCP/IP Volume III: Client, Server Programming and Applications, BSD Socket Version (with D. Stevens), second edition 1996. 0,13,260969,X.
8. Internetworking With TCP/IP Volume III: Client, Server Programming and Applications, AT&T TLI Version (with D. Stevens), 1994. ISBN 0,13,474230,3.
9. Internetworking With TCP/IP Volume III: Client, Server Programming and Applications, Window Sockets Version (with D. Stevens), 1997. ISBN 0,13,848714,6