		L	T	P	C
1901MA102	**MATHEMATICS – I** (Calculus and Linear Algebra) (CSE, IT)	3	2	0	4

Aim of the course:

- To familiarize the students with differential calculus.
- To develop the use of integration techniques that is needed by engineers for practical applications.
- To familiarize the student with concepts of matrices. This is needed in many branches of engineering.
- To make the students understand the idea of vector spaces and linear transformations.
- To acquaint the student appreciate the purpose of using transforms to create a new domain of the matrix.

PREREQUISITES: BASIC MATHEMATICS

Module 1: Differntial Calculus
Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature- Evolutes and involutes.

Module 2: Integral Calculus
Double integration – Cartesian and polar coordinates – Change the order of Integration – Applications: Area of a curved surface using double integral – Triple integration in Cartesian co-ordinates – Volume as triple integral.

Module 3: Linear Algebra
Matrices,Vectors: addition and Scalar multiplication, matrix multiplication; Linear systems of equations, linear independence, rank of a matrix, determinants,Cramer's rule, inverse of a matrix,Gauss elimination and Gauss-Jordan methods.

Module 4: Vector Spaces
Vector Space,Linear Independence of Vectors,basis,dimesnsions; Linear Transformations (maps) range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps, Matrix associated with a linear map.

Module 5: Matrices
System of Linear Equations; Symmetric,Skew-symmetric and orthogonal matrices - Eigen values and Eigen Vectors ; Diagonalization of Matrices - Reduction of a quadratic form to a canonical form by orthogonal transformation .

Total Hours: 60

COURSE OUTCOMES   Skill Development

After completion of the course, the student will be able to
CO1: Develop the evolutes and envelopes of given curves by means of radius and centre of curvature
CO2: Determine the area and volume of a curve using double and triple integration
CO3: Calculate the inverse and rank of a square matrix and Make use of Matrix Operations to solve the systems of linear equations
CO4: Determine Vector spaces and subspaces using linear independence and span of a set of vectors, basis and dimension.
CO5: Determine the nature of the matrix using Orthogonal Transformation.

REFERENCES BOOKS:

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2018.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

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L T P C
3 0 0 3

1901CH104   **APPLIED CHEMISTRY IN INFORMATICS**
(for CSE&IT)

Aim of the course: Applied Chemistry in informatics course is designed to provide chemistry and its application to the Computer science and engineering students. The course is a combination of the theoretical concepts and application of the theoretical concepts of chemistry. It includes the study of applications of cell chemistry, material for computers, nano materials, polymers and chem informatics as well as their theoretical parts. The course is designed very efficiently, specifically to support the computer science programme through chemistry .

PREREQUISITES: BASIC CHEMISTRY

MODULE I   CELL CHEMISTRY   9
hours

Cell terminology Cell reactions - Conductors, insulators-Daniel cell-Difference between electrolytic cells and electrochemical cells. Reversible cells and irreversible cells -types- EMF and its applications - Nernst equation (derivation).Single electrode potential - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode

MODULE II   MATERIALS FOR COMPUTERS   **9 hours**

Materials for computers and communications - crystalline semiconductors; metalized film conductors; dielectric films; solders; ceramics and polymers. Electronic materials, Semiconductor crystals - Silicon, III–V compounds, Photoresist films, Packaging materials, Photonic materials, Crystalline materials - Epitaxial layers, Optical switching, Optical transmission. NLO and OLED Materials.

MODULE III NANOTECHNOLOGY   **9 Hours**

Nanotechnology - Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties.Nanoparticles: nano cluster, nano rod, nanotube(CNT) and nanowire. Synthesis: precipitation, chemical vapour deposition, laser ablation; Properties and applications.

MODULE IV POLYMERS   **9 Hours**

Introduction: Classification of polymers — Natural and synthetic; Thermoplastic and Thermosetting. Functionality — Degree of polymerization. Addition (Free Radical Mechanism) condensation and copolymerization. Conductive polymers- Fabrication of Plastics. Preparation properties and uses of Nylon66, Teflon, Epoxy resin.

MODULE V   CHEMINFORMATICS   **9 Hours**

Cheminformatics-Definition — types of Bonds - Bond length- Bond angles - Torsional angles - Ramachandran plot for poly peptides with dihedral angles. Coordinates of atom in a molecule - Conformation - Cambridge structural database - Application— Linear format - SMILEYS notation — MOL format. Similarity search — Sub structure search - Structural keys — Finger print —structure based drug design — protein data bank- Application.

Total: 45 Hours

COURSE OUTCOMES   Skill Development

After completion of the course, the student will be able to
CO1: Describe electrode potential concepts using electro chemical principles
CO2: Illustrate the semiconductor materials and its importance
CO3: Classify the nano materials used for different purposes
CO4: Describe the various polymer materials and its formation
CO5: Discuss the different chemoinformtics tools used

REFERENCE:
1. Jain and Jain, "Engineering Chemistry", Sixteenth edition, Dhanpatrai publications, 2012.
2. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2010.
3. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New 2015.
4. Kannan P. and Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd.Chennai, 2009
5. Peter Atkins and Julio de Paula, "Physical Chemistry", VII Edition, Oxford University Press, New York, 2002
6. https://www.electrical4u.com/classification-of-electrical-conducting-material
7. https://en.wikipedia.org/wiki/Ramachandran lot
8. Wiki online sources

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	L	T	P	C
PROGRAMMING FOR PROBLEM SOLVING (Common for all B.E./B.Tech Programme)	3	0	0	3

1901GEX03

COURSE OBJECTIVES:

1. To prepare students to comprehend the fundamental concepts
2. To demonstrate fine grained operations in number system
3. To gain exposure in programming language using C
4. To develop programming skills using the fundamentals and basics of C Language

MODULE I   INTODUCTION TO PROGRAMMING   **9 Hours**

Components of Computers and its Classifications- Problem Solving Techniques – Algorithm- Flowchart– Pseudo code – Program-Compilation -Execution

MODULE II   BASICS OF C PROGRAMMING   **9 Hours**

Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/output statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives.

MODULE III   ARRAYS AND STRINGS   **9 Hours**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays – Example Program: Matrix Operations - String operations

MODULE IV   FUNCTIONS AND POINTERS   **9 Hours**

Introduction to functions: Function prototype, function definition, function call, Built-in functions – Recursion – Example Program – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference

MODULE V   STRUCTURES & FILE PROCESSING   **9 Hours**

Structure - Nested structures – Pointer and Structures – Array of structures – Example Program using structures and pointers – Dynamic memory allocation -Files – Types - File processing: Sequential access, Random access -Command line arguments

TOTAL: 45 HOURS

FURTHER READING:

Object Oriented Programming Approach.

COURSE OUTCOMES: *Employability*

On the successful completion of the course, students will be able to

CO1: Describe basic concepts of computers
CO2: Paraphrase the operations of number system
CO3: Describe about basic concepts of C-Language
CO4: Understand the code reusability with the help of user defined functions
CO5: Analyze the structure concept, union, file management and preprocessor in C language

REFERENCES:

1. Paul Deitel and Harvey Deitel, ―C How to Program‖, Seventh edition, Pearson Publication
2. Juneja, B. L and Anita Seth, ―Programming in C‖, CENGAGE Learning India pvt. Ltd., 2011
3. Pradip Dey, Manas Ghosh, ―Fundamentals of Computing and Programming in C‖, First Edition, Oxford University Press, 2009.
4. Anita Goel and Ajay Mittal, ―Computer Fundamentals and Programming in C‖, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",McGraw-Hill Education, 1996.

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PROGRAMMING FOR PROBLEM SOLVING	L	T	P	C
(Common for all B.E./B.Tech Programme)	3	0	0	3

1901GEX03

COURSE OBJECTIVES:

1. To prepare students to comprehend the fundamental concepts
2. To demonstrate fine grained operations in number system
3. To gain exposure in programming language using C
4. To develop programming skills using the fundamentals and basics of C Language

MODULE I   INTODUCTION TO PROGRAMMING   **9 Hours**

Components of Computers and its Classifications- Problem Solving Techniques – Algorithm- Flowchart– Pseudo code – Program-Compilation -Execution

MODULE II   BASICS OF C PROGRAMMING   **9 Hours**

Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/output statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives.

MODULE III   ARRAYS AND STRINGS   **9 Hours**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays – Example Program: Matrix Operations - String operations

MODULE IV   FUNCTIONS AND POINTERS   **9 Hours**

Introduction to functions: Function prototype, function definition, function call, Built-in functions – Recursion – Example Program – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference

MODULE V   STRUCTURES & FILE PROCESSING   **9 Hours**

Structure - Nested structures – Pointer and Structures – Array of structures – Example Program using structures and pointers – Dynamic memory allocation -Files – Types - File processing: Sequential access, Random access -Command line arguments

TOTAL: 45 HOURS

FURTHER READING:

Object Oriented Programming Approach.

COURSE OUTCOMES: Employability

On the successful completion of the course, students will be able to

CO1: Describe basic concepts of computers
CO2: Paraphrase the operations of number system
CO3: Describe about basic concepts of C-Language
CO4: Understand the code reusability with the help of user defined functions
CO5: Analyze the structure concept, union, file management and preprocessor in C language

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2. Juneja, B. L and Anita Seth, ―Programming in C‖, CENGAGE Learning India pvt. Ltd., 2011
3. Pradip Dey, Manas Ghosh, ―Fundamentals of Computing and Programming in C‖, First Edition, Oxford University Press, 2009.
4. Anita Goel and Ajay Mittal, ―Computer Fundamentals and Programming in C‖, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",McGraw-Hill Education, 1996.

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1901ENX01	ENGLISH FOR ENGINEERS	L	T	P	C
	(Common for all B.E./B.Tech. Programme)	2	0	0	2

Course Overview:

The course "English for Engineers" aims at honing the basic language skills of the learners. The course is a combination of introducing the rudiments of grammar and application of the principles in both verbal and written expressions. Students are trained to read and comprehend technical texts in the field of engineering. They are guided to acquire vocabulary building and write efficiently in technical writing .The course has been deftly planed and the learners are guided to use the LSRW skills for acquiring their technical knowhow and exhibiting their technical achievement by verbal and written mode .Students are encouraged to use English as a tool to get technical knowledge and display their attainment

Course Objectives:

- To teach the students to compose grammatically correct sentences for oral as well as written communication.
- To make the learners to interpret perfectly after paying attention to an audio on any theme.
- To expose the students to organize formal presentations effectively.
- To cultivate learners to explain the content of any written or visual material.
- To help the learners to get trained in generate technical and non-technical documents with appropriate contents and context.
- To motivate the students to Monitor, analyse and adjust their own communication.

MODULE I   FOCUS ON LANGUAGE (Vocabulary and Grammar)   **9 Hours**

Vocabulary -The Concept of Word Formation - prefixes- suffixes- Synonyms – Antonyms - Grammar -Articles- Preposition- Adjective-Adverb-connectives -Tenses (present, past & future) - Sentence pattern- types of sentences -Active voice –passive voice and Impersonal passive voice - Wh- Questions.

MODULE II   LISTENING SKILLS   **9 Hours**

Listening- listening intently-arousing and sustaining interest-listening to short or longer texts- formal and informal conversations- telephonic etiquettes- narratives from different sources. -listening and Note taking-correlative verbal and nonverbal communication-listening to TOEFL & IELTS programs-listening to Project presentation- listening to technical seminar and conferences.

MODULE III   SPEAKING SKILLS   **9 Hours**

Speaking - stress and intonation –persuasive speaking -Describing person, place and thing - sharing   personal information — greetings –taking leave -Individual and Group Presentation-impromptu Presentation-public speaking-Group Discussion- project planning-facing viva voce and delivering project.

MODULE IV   READING SKILLS   **9 Hours**

Reading– comprehending general and technical articles -cloze reading - inductive reading- short narrative and descriptions from newspapers – Skimming and scanning-reading and interpretation-critical reading interpreting and transferring graphical information- sequencing of sentences-analytical reading on various Projects.

MODULE V   WRITING SKILLS   **9 Hours**

Writing- Precise writing –Summarizing- interpreting visual texts (pie chart, bar chart, picture - advertisements etc., - Proposal writing (launching new units or department in a institution or industry & to get loan from bank) -report writing (accident, progress, project, survey, Industrial visit)- job application-e-mail drafting- letter writing (permission, accepting and decaling)-instructions – recommendations –checklist

                                                                                                                                    TOTAL: 45 HOURS

Course Outcomes (COs):   *Skill Development*

After successful completion of the course, students will be able to

CO1: Compose grammatically correct sentences for oral as well as written communication.
CO2: Interpret perfectly after paying attention to an audio on any theme.
CO3: Organize formal presentations effectively.
CO4: Explain the content of any written or visual material.
CO5: Generate technical and non-technical documents with appropriate contents and context.
CO6: Monitor, analyze and adjust their own communication.

REFERENCES:

1. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: Principles and Practice", Oxford University Press, New Delhi, 2011.
2. Rizvi and Ashraf M., "Effective Technical Communication", Tata McGraw-Hill, New Delhi, 2005.
3. G. Radhakrishna Pillai, "English for Success", Central Institute of English and Foreign Languages", Emerald Publishers ,Hyderabad, 2003

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4.   Jones, D, "The Pronunciation of English", CUP, . Cambridge,2002.

| 1901GEX52 | COMPUTER PROGRAMMING LAB
(Common for all B.E./B.Tech. Programme) | L
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List of Experiments: *Skill Development, Employability*
1.   Working with word and style sheets
2.   Write a C program to implement basic concepts
3.   Write a C program to implement Decision Making and Branching statements
4.   Write a C program to implement looping statements
5.   Write a C program to implement Arrays
6.   Write a C program to implement Strings
7.   Write a C program to implement pointers
8.   Write a C program to implement Structures
9.   Write a C program to work with files in C

Total: 45 Hours

References:

1.   Paul Deitel and Harvey Deitel, ―C How to Program‖, Seventh edition, Pearson Publication
2.   Juneja, B. L and Anita Seth, ―Programming in C‖, CENGAGE Learning India pvt. Ltd., 2011
3.   Pradip Dey, Manas Ghosh, ―Fundamentals of Computing and Programming in C‖, First Edition, Oxford University Press, 2009.
4.   Anita Goel and Ajay Mittal, ―Computer Fundamentals and Programming in C‖, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5.   Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",McGraw-Hill Education, 1996.

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		L	T	P	C
1901GE151	ENGINEERING INTELLIGENCE I (Common for all B.E./B.Tech. Programme)	0	0	2	1

MODULE I   BEHAVIORAL CHANGES – TRANSITION OF SCHOOL TO COLLEGE   6 Hours

Vocabulary -The Concept of Word Formation - prefixes- suffixes- Synonyms – Antonyms - Grammar - Articles-Preposition- Adjective-Adverb-connectives -Tenses (present, past & future) - Sentence pattern- types of sentences -Active voice –passive voice and Impersonal passive voice - Wh- Questions.

MODULE II   EXPOSURE TO INDIVIDUAL COMPETANCE   6 Hours

Listening- listening intently-arousing and sustaining interest-listening to short or longer texts- formal and informal conversations- telephonic etiquettes- narratives from different sources. -listening and Note taking- correlative verbal and nonverbal communication-listening to TOEFL & IELTS programs-listening to Project presentation- listening to technical seminar and conferences.

MODULE III   CAREER PLANNING   6 Hours

Speaking - stress and intonation –persuasive speaking -Describing person, place and thing - sharing personal information — greetings –taking leave -Individual and Group Presentation-impromptu Presentation-public speaking-Group Discussion- project planning-facing viva voce and delivering project.

MODULE IV   INTRODUCTION TO COMMUNICATION SKILLS   6 Hours

Reading– comprehending general and technical articles -cloze reading - inductive reading- short narrative and descriptions from newspapers – Skimming and scanning-reading and interpretation-critical reading interpreting and transferring graphical information- sequencing of sentences-analytical reading on various Projects.

MODULE V   COMMUNICATION EXERCISE-1   6 Hours

Writing- Precise writing –Summarizing- interpreting visual texts (pie chart, bar chart, picture - advertisements etc., - Proposal writing (launching new units or department in a institution or industry & to get loan from bank) -report writing (accident, progress, project, survey, Industrial visit)- job application-e-mail drafting- letter writing (permission, accepting and decaling)-instructions – recommendations –checklist

TOTAL: 30 HOURS

Course Outcomes: Skill Development

At the end of the course, students will be able to
CO1: Apply their knowledge and skill to engineering field
CO2: Understand the value of individual competence
CO3: Apply their skill to career planning and team work
CO4: Illustrate verbal and non verbal skills
CO5: Use various communication skill exercise to write and interpret the contents

REFERENCES:
1. Dr.P.Prasad(2012) "The Functional Aspects of COMMUNICATION SKILLS";fifth Edition;S.K Kataria &Sons Publication
2. Kalyana; (2015) "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd.
3. Aruna Koneru (2008) "Professional Communication"; Second edition; Tata McGraw-Hill Publishing Ltd.

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1901CHX51	ENGINEERING CHEMISTRY LAB	L	T	P	C
	(Common for all B.E./B.Tech. Programme)	0	0	2	1

List of Experiments: *Skill Development, Employability*

1. Determination of total, temporary & permanent hardness of water by EDTA method
2. Determination of strength of given hydrochloric acid using pH meter
3. Estimation of iron content of the given solution using potentiometer
4. Estimation of sodium present in water using flame photometer
5. Corrosion experiment – weight loss method
6. Determination of molecular weight of a polymer by viscometer method
7. Conductometric titration of strong acid Vs strong Base
8. Estimation of dissolved oxygen in a water sample/sewage by Winkler's method.
9. Comparison of alkalinities of the given water samples
10. Determination of concentration of unknown colored solution using spectrophotometer
11. Determination of percentage of copper in alloy
12. Determination of ferrous iron in cement by spectrophotometry method
13. Adsorption of acetic acid on charcoal
14. Determination the flash point and fire point of a given oil using pen skyMartine closed cup apparatus
15. Determination the calorific value of solid fuels
16. Determination the structural of the compound using chemo software.

Total: 45 Hours

References:

1. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel"s Textbook of practical organic chemistry", LBS Singapore (1994).
2. Jeffery G.H., Bassett J., Mendham J.and Denny vogel"s R.C, "Text book of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
3. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New Yor (2001).
4. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.

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	COMMUNICATION SKILLS LAB	L	T	P	C
1901HSX51	(Common for all B.E./B.Tech. Programme)	0	0	2	1

Course Overview:

English- being the foremost global language has its domination in internationally sensitive domains such as science and technology, business and commercial relation, education and diplomatic relationships, politics and administration and so on. It is the language of corporate India, a passport for better career, better pay, and advanced knowledge and for communication with the entire world. In higher education, English is the prevalent prestigious language. Careers in any area of business communication or within the government, or in science and technology require fluency in English The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint students with a language that enjoys currency as a lingua franca of the globe. For prospective engineers nothing could be more useful or productive than being able to reach out to the world of technology. In the ELCS lab the students are trained in Communicative English Skills, phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations - both extempore and Prepared-seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer , debates, description of person, place, objects etc; . The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc

Objectives :

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.
- To train students to use language appropriately for interviews, group discussion and public speaking
- To help the students to cultivate the habit of reading passages from the computer monitor, thus provides them the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.
- To train them to face interviews with confidence and enable them to prepare resume with cover letter.
- To prepare them to use communicative language and participate in public speaking.
- To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.
- To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.
- To expose the Students to participate in group discussions, debates with ease.

List of Exercises :

I Activities on Fundamentals of Listening and Inter-personal Communication   **6 Hours**

Listening to conversation, listening to technical presentation- listening to online video conferencing ,interviews and webinars -starting a conversation - responding appropriately and relevantly - using appropriate body language - Role Play in different situations & Discourse

II Activities on Reading Comprehension   **6 Hours**

General Vs Local comprehension- reading for facts- guessing meanings from context-Scanning-skimming and inferring meaning- critical reading & effective googling- TOFEL,IELTS-reading online journals.

III Activities on Writing Skills   **6 Hours**

Structure and presentation of different types of writing - letter writing - Resume writing- e- correspondence - Proposal writing - Technical report writing - Portfolio writing - planning for writing - improving one's writing

IV Activities on Presentation Skills   **6 Hours**

Oral presentations (individual and group) through JAM sessions – presentation on online platform (webinars, online meeting) - seminars -PPTs and written presentations through posters- projects- report- e-mails- assignments etc.- creative and critical thinking.

6 Hours

V Activities on Soft Skills

Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation-Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews-Time management-stress management –paralinguistic features- Multiple intelligences – emotional intelligence – spiritual quotient (ethics) – intercultural communication – creative and critical.

TOTAL: 30 HOURS

Course Outcomes (COs): *Skill Development*

After successful completion of the course, students will be able to

CO1: Compose grammatically correct sentences for oral as well as written communication.
CO2: Interpret perfectly after paying attention to an audio on any theme.
CO3: Organize formal presentations effectively.
CO4: Explain the content of any written or visual material.
CO5: Generate technical and non-technical documents with appropriate contents and context.
CO6: Monitor, analyse and adjust their own communication.

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1. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: Principles and Practice", Oxford University Press, New Delhi, 2011.
2. Sudha Rani, D , "Advanced Communication Skills Laboratory Manual" , Pearson Education 2011.
3. Paul V. Anderson ,"Technical Communication",. Cengage Learning pvt. Ltd. New Delhi, 2007.
4. "English Vocabulary in Use series", Cambridge University Press 2008.
5. "Management Shapers Series" ,Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Rizvi and Ashraf M., "Effective Technical Communication", Tata McGrawHill, New Delhi, 2005.
7. Jones, D, "The Pronunciation of English", CUP, . Cambridge,2002.

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				L	T	P	C
1901MA202	ENGINEERING MATHEMATICS-II			3	2	0	4

Aim of the course: To enable the students by studying various aspects of Probability and Statistics, such as, one dimensional random variables, two dimensional random variables, testing of hypothesis, design of experiments to apply for various concepts of Information Technology and Computer Science Engineering.

PREREQUISITES: Statistics and Probability

COURSE CONTENTS

Probability: Probability- Theorems on Probability- Conditional Probability – Baye's Theorem- Discrete and continuous random variables – Moments – Moment generating functions –Real Time Problems

Theoretical Distribution: Discrete Distributions: Binomial, Poisson, Geometric - Continuous Distributions: Uniform, Exponential, Normal distributions- Application of Distribution in Engineering Problems

Two - Dimensional random variables: Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression- Rank Correlation.

Applied Statistics: Measures of Central Tendency – Measures of Dispersion - Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.

Testing of Hypothesis: Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations. Small samples: Test for single mean, difference of means, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Total Hours: 60

COURSE OUTCOMES: *Skill Development*

Upon completion of this course, students will be able to

CO1: Apply the parameters of unpredictable experiments using probability concepts.

CO2: Construct probabilistic models for observed phenomena through discrete and continuous distributions.

CO3: Associate the random variables, by designing joint distribution and correlate the random variables.

CO4: Make use of the concept of testing of hypothesis for small and large samples

CO5: Make use of the concept of classification of design of experiments in optimization problems

REFERENCES BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

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1901PH201	PHYSICS FOR INFORMATION SCIENCE	L	T	P	C
		3	0	0	3

Aim: To make students understand the semiconductor physics and their applications in computer science and engineering

9 Hours

MODULE I   ELECTRONIC MATERIALS

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Occupation probability, Fermi level.

9 Hours

MODULE II   SEMICONDUCTORS

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- Concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal- semiconductor junction (Ohmic and Schottky).

9 Hours

MODULE III   MAGNETIC PROPERTIES OF MATERIALS

Magnetic dipole moment - magnetic permeability and susceptibility - diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Ferromagnetism: origin and exchange interaction- saturation magnetization and Curie temperature – Domain Theory- M-H behaviour – Hard and soft magnetic materials – examples and uses-- Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

9 Hours

MODULE IV   OPTICAL PROPERTIES OF MATERIALS

Classification of optical materials – carrier generation and recombination processes - Absorption emission and scattering of light in metals, insulators and semiconductors (qualitative approach only) - photo current in a P-N diode – solar cell - LED – Organic LED – Laser diodes – Optical data storage techniques.

9 Hours

MODULE V   NANO DEVICES

Electron density in bulk material – Size dependence of Fermi energy – Quantum confinement – Quantum structures – Density of states in quantum well, quantum wire and quantum dot structure - Band gap of nanomaterials – Tunneling: single electron phenomena and single electron transistor – Quantum dot laser.FET from SWNT– Carbon nanotubes: Properties and applications.

TOTAL: 45 HOURS

COURSE OUTCOMES: *Skill Development*

Upon completion of this course, students will be able to

CO1: Apply the parameters of unpredictable experiments using probability concepts.
CO2: Construct probabilistic models for observed phenomena through discrete and continuous distributions.
CO3: Associate the random variables, by designing joint distribution and correlate the random variables.
CO4: Make use of the concept of testing of hypothesis for small and large samples
CO5: Make use of the concept of classification of design of experiments in optimization problems

REFERENCES:
1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
6. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL.

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	L	T	P	C
1901GEX01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	0	3

COURSE OBJECTIVES:
1. To introduce basic electrical terminologies and laws
2. To impart knowledge on solving series and parallel circuits
3. To introduce about the three phase system
4. To explain the working principle of dc and ac machines, power plants
5. To familiarize about basic electronic components, circuits, transducers, digital logic and communication systems

MODULE I   INTRODUCTION TO DC AND AC CIRCUITS   **7 Hours**

Introduction to DC and AC circuits: Ohms law - Kirchhoff's laws - Mesh analysis - Nodal analysis - Generation of AC waveforms - Analysis of R-L, R-C, R-L-C circuits - Introduction to three phase systems - Types of connections.

MODULE II   ELECTRICAL MACHINES   **6 Hours**

Electrical Machines: DC Generator, DC Motor, Transformer, Induction Motor: Working principle, construction and applications.

MODULE III   MEASURING INSTRUMENTS   **6 Hours**

Measuring instruments: Classification of instruments; Voltmeter, Ammeter, Wattmeter, Energy meter, Multimeter, CRO: Principles and operation.

MODULE IV   SEMICONDUCTOR DEVICES   **7 Hours**

Semiconductor devices: V-I characteristics of PN junction diode and Zener diode; Rectifiers - Half wave and full wave rectifiers; BJT - configurations; Amplifiers & Oscillators: classification, operation and applications; SCR: Construction and V-I characteristics; Basic power converters (Block diagram approach only).

MODULE V   DIGITAL SYSTEMS   **6 Hours**

Digital systems: Boolean algebra - Reduction of Boolean expressions - De-Morgan''s theorem - Logic gates - Implementation of Boolean expressions.

MODULE VI   COMMUNICATION SYSTEMS   **6 Hours**

Communication Systems: Model of communication system - Analog and digital, Wired and wireless channel - Block diagram of various communication systems - Microwave, satellite, optical fiber and cellular mobile system.

MODULE VII   ELECTRICAL SAFETY AND WIRING   **7 Hours**

Electrical safety and wiring: Safety measures in electrical system - Safety devices - types of wiring - Wiring accessories- staircase, fluorescent lamps and corridor wiring - Basic principles of earthing - Types of earthing - layout of generation, transmission and distribution of power (Single line diagram).

TOTAL: 45 HOURS

COURSE OUTCOMES: Employability
On the successful completion of the course, students will be able to
CO1: Remember the basic laws and fundamental concepts related to electrical, electronics and communication engineering
CO2: Apply basic concepts to solve problems in DC and AC circuits
CO3: Recall the principle of operation of DC & AC machines and power plants
CO4: Summarize the Boolean algebra and digital logic gates
CO5: Elucidate the characteristics of diode, BJT and applications of amplifiers and oscillators
CO6: Explain the operation of functional blocks of various communication systems

REFERENCES:
1. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, PHI Learning, 2010.
2. R. Muthusubramaniam, S. Salaivahanan and K.A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering",Tata McGraw Hill, 2004.
3. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI learning, New Delhi, 2004

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4. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics", S.K. Kataria and Sons, Reprint 2012 Edition.
5. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson, 11th Edition, 2013.
6. George Kennedy and Bernard Davis, "Kennedy"s Electronic communication Systems", McGraw Hill Education, 5th Edition, 2011.
7. Donald P. Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", McGraw-Hill Education, 8th Edition, 2014.

1901GEX02	ENGINEERING GRAPHICS	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

1. To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
2. To expose them to existing national standards related to technical drawings

MODULE I   CONCEPTS AND CONVENTIONS (Not for Examination)   **5 Hours**

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

MODULE II   PLANE CURVES AND FREE HAND SKETCHING   **9 Hours**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.
Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of Objects.

MODULE III   PROJECTION OF POINTS, LINES AND PLANE SURFACES   **9 Hours**

Orthographic projection- principles-Principal Planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

MODULE IV   PROJECTION OF SOLIDS   **9 Hours**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

MODULE V   PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF   **9 Hours**
                     SURFACES

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

MODULE VI   ISOMETRIC AND PERSPECTIVE PROJECTIONS   **9 Hours**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.
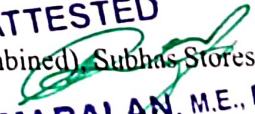
TOTAL: 45+5 HOURS

COURSE OUTCOMES: Skill Development

On the successful completion of the course, students will be able to
CO1: Perform free hand sketching of basic geometrical constructions and multiple views of objects.
CO2: Do orthographic projection of lines and plane surfaces.
CO3: Draw projections and solids and development of surfaces.
CO4: Prepare isometric and perspective sections of simple solids.
CO5: Demonstrate computer aided drafting

REFERENCES:

1. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined) Subhas Stores, Bangalore,2016.

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2. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
3. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2015.
4. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2017.
5. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2015.
6. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2016.

1901GE201	ENGINEERING EXPLORATION	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:
- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating ill-defined problems.
- Undergo several design challenges and work towards the final design challenge
- **Apply Design Thinking on the following Streams to** *Skill Development*
  Project Stream 1: Electronics, Robotics, IOT and Sensors
  Project Stream 2: Computer Science and IT Applications
  Project Stream 3: Mechanical and Electrical tools
  Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?
- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human- centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

TASKS TO BE DONE:
Task 1: Everyone is a Designer
- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast
- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems
- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

Task 4: Empathizing
- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating
- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping
- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing
- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:
- Final Report Submission and Presentation

- **Method of Evaluation: Same as Mini project category. Project exhibition may be conducted.**

REFERENCES:
1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:
1. Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
2. Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
3. Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
4. Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

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1901GE254	COMPUTER HARDWARE AND IT ESSENTIALS LAB	L	T	P	C
		0	0	2	1

Employability, Entrepreneurship

List of Experiment

1. Study of hardware components (such as storage devices, I/O devices, CPU, Motherboard, other peripherals).
2. Installation of operating systems (Windows and Linux).
3. Other software installation.
4. Study of network components.
5. Network establishment(configuring IP address, Domain name system)
6. Study of Internet.
7. Introduction to Web.
8. Usage of internet services- Email, File Sharing, Social Media etc.
9. Study of firewalls and Antivirus.
10. Troubleshooting various problems.

TOTAL: 30 HOURS

REFERENCES:

1. Craig Zacker& John Rourke, "The complete reference:PC hardware", Tata McGrawHill, New Delhi, 2001.
2. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGrawHill, New Delhi, 2003.
3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance",
4. Tata McGraw-Hill, New Delhi, 2002
5. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.
6. James F. Kurose, ―Computer networking: A Top-Down Approach‖, Sixth Edition, Pearson, 2012.
7. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014
8. Craig Zacker& John Rou ke, "The co plete reference:PC hardware", Tata McGrawHill, New Delhi, 2001.

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1901GE252	ENGINEERING INTELLIGENCE II	L	T	P	C
		0	0	2	1

Prerequisite: Engineering Intelligence - I

6 Hours

MODULE I   VOCABULARY BULIDING

Parts of Grammar- SVA- Art of Writing- word building activities

6 Hours

MODULEII   COMMUNICATION WORKSHOP

Story Telling- Newspaper Reading-Extempore.

6 Hours

MODULEIII   INTERPERSONAL SKILLS

Personality Development - Creativity and innovation –Critical Thinking and Problem Solving – Work Ethies-Technical Skill Vs Interpersonal Skills

6 Hours

MODULEIV   LEADERSHIP& EMPLOYABILITY SKILLS

Levels of Leadership-Making of leader-Types of leadership-Transactions Vs Transformational Leadership – Exercises - Industry Expectations & Career Opportunities- Recruitment patterns.

6 Hours

MODULE V   RESUME BUILDING

Importance of Resume- Resume Preparation - introducing onself

TOTAL: 30 HOURS

Course Outcomes: Skill Development

On the successful completion of the course, students will be able to

CO1: Understand various vocabulary building activites

CO2: Use various communication skill workshop for reading and writing.

CO3: Apply interpersonal skill to motivate creating and innovating skills

CO4: Apply various leadership and employability skill to get career opportunities

CO5: Prepare resume with necessary components

REFERENCES:

1. Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; Oxfor Publishers.

2. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007.

3. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017.

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		L	T	P	C
1901GEX51	CAD (COMPUTER AIDED DRAFTING) LAB	0	0	2	1

List of Experiments: *Employability, Entrepreneurship*

Basics commands of a CAD software- two-dimensional drawing, editing, layering and dimensioning - coordinate Systems-Drawing practice - orthographic views of simple solids using CAD software.

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.

2. Drawing of a Title Block with necessary text and projection symbol.

3. Drawing of curves like parabola, spiral, involute using B-spline or cubic spline.

4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.

5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).

6. Drawing sectional views of prism, pyramid, cylinder, cone, etc,

7. Drawing isometric projection of simple objects.

8. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

Total: 30 Hours

References:
1. N.D. Bhatt, Machine Drawing, Charotar Publishing House Pvt. Ltd., 2014.
2. P.S. Gill, A Textbook of Machine Drawing, Katson books, 2013.
3. R.K. Dhawan, A Textbook of Machine Drawing, S. Chand,2012.
4. K.C. John, Textbook of Machine Drawing, PHI Learning Pvt. Ltd.,2009.

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1901GEX53	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	L	T	P	C
		0	0	2	1

List of Experiments: Skill Development

1. Experiments related to verification of Ohm''s law and Kirchhoff''s laws
2. Experiments involving logic gates
3. Fan and light control using regulators
4. Design of 6V regulated power supply
5. Energy conservation demonstration experiment using energy meter
6. Waveform generation and calculation of rms and average values
7. IC 555 and IC 741 based experiments
8. Experiments in earthing
9. Staircase wiring and residential building wiring
10. Speed control of DC shunt motor

Total: 30 Hours

References:

1. Edward Hughes, " Electrical Technology,", Pearson Education
2. D.P. Kothari and Nagrath" Basic Electronics",MH Education 2013.
3. Paul Scherz and Simon Monk "Practical Electronics for inventors" Mc Graw Hill Publications 2013.

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1901PHX51	ENGINEERING PHYSICS LAB	L	T	P	C
		0	0	2	1

List of Experiments: *Skill Development, Employability*

1. Determination of wavelength of various colours of mercury spectrum using Laser grating
2. Determination of velocity of liquids using ultrasonic interferometer
3. Determine the dispersive power of a prism using spectrometer
4. Determine the unknown resistance of the given wire using Carey-Foster"s Bridge
5. Determine the band gap of the given semiconductor
6. Determine the acceptance angle and particle size using Laser
7. Torsional pendulum – Rigidity modulus of a steel wire
8. Thickness of a thin wire – Air Wedge
9. Measurement of Young"s modulus – Uniform and Non-uniform bending
10. Thermal conductivity –Lee"s Disc method

Total: 30 Hours

References:

1. „Practical Physics", R.K. Shukla, Anchal Srivastava, New age international (2011)
2. „B.Sc. Practical Physics", C.L Arora, S. Chand &Co. (2012)

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1701MA301	ENGINEERING MATHEMATICS III	L	T	P	C
	(Common to B.E - Civil, CSE, EEE, Mech B.Tech- IT Degree Programmes)	3	2	0	4

PREREQUISITE :
1. Engineering Mathematics I
2. Engineering Mathematics II

COURSE OBJECTIVES:
1. To introduce Fourier series analysis and applications in Engineering, apart from its use in solving boundary value problems.
2. To acquaint the student with Fourier transform techniques used in wide variety of situations.
3. To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I   FOURIER SERIES   **12 Hours**
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Parseval's identity – Harmonic analysis – Simple Applications

UNIT II   FOURIER TRANSFORMS   **12 Hours**
Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity

UNIT III   PARTIAL DIFFERENTIAL EQUATIONS   **12 Hours**
Formation of partial differential equations – Singular integrals –– Solutions of standard types of first order partial differential equations – Lagrange's linear equation –– Linear partial differential equations of second order with constant coefficients of homogeneous type- Applications

UNIT IV   APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS   **12 Hours**
Classification of PDE – Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction.

UNIT V   Z – TRANSFORMS AND DIFFERENCE EQUATIONS   **12 Hours**
Z - transforms – Elementary properties – Inverse Z – transform (using partial fraction and residues) – Convolution theorem – Formation of difference equations – Solution of difference equations using Z – transform.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Linear Algebra
2. Numerical Solution of non-homogeneous partial differential equations

COURSE OUTCOMES:
On the successful completion of the course, students will be able to
CO1   Use Fourier series analysis which is central to many applications in engineering
CO2   Apply Fourier transform techniques used in wide variety of situations
CO3   Compute the solution of partial differential equations
CO4   Solve boundary value problem using partial differential equation   *Skill Development*
CO5   Apply Z transform techniques for discrete time systems

REFERENCES:
1. Veerarajan. T., "Transforms and Partial Differential Equations", Second reprint, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012
2. Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi, 2012.
3. Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt Ltd , 2007
4. Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-GrawHill Publishing Company Limited, New Delhi, 2008.
5. Narayanan.S., Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students" Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998.
6. www.nptelvideos.in/2012/11/mathematics-iii.html

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1702IT301	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	2	4

PREREQUISITE :
> Programming in C and C++

COURSE OBJECTIVES:
1. Learn the fundamental concepts of Data Structures
2. Study the various algorithms and analysis methods
3. Use various data structures and algorithms techniques for real time examples

UNIT I   INTRODUCTION   **9 Hours**
Data Structures – Programming Strategies – ADT – Algorithms – Problem Solving – Complexity – Asymptotic Notations – Recurrence Relations

UNIT II   DATA STRUCTURES   **9 Hours**
Array – List: Types, Applications, Linked List – Stack: Operations, Applications, Implementations – Queue: Operations, Applications, Implementations – Tree: Types, Implementation, Applications

UNIT III   DIVIDE AND CONQUER & DYNAMIC PROGRAMMING   **9 Hours**
Divide and Conquer techniques with Algorithm Analysis – Merge Sort – Optimal Binary Search Tree, Huffman Tree – Strassen's Matrix Multiplications. Dynamic Programming with Algorithm Analysis – Graph – Warshall's, Floyd' Algorithms – Binomial Coefficient

UNIT IV   GREEDY AND ITERATIVE METHODS   **9 Hours**
Prim's Algorithm – Kruskal's Algorithms – Dijikstra's Algorithms – The stable Marriage Problem – Algorithm Analysis

UNIT V   ALGORITHM ANALYSIS AND APPLICATIONS   **9 Hours**
Algorithm Analysis and power – P,NP,NP-Complete Problems – Backtracking – N-Queen Problem, Graph Coloring – Branch and Bound –Decision Tree - Travelling Salesman Problem – Knapsack Problem

LIST OF EXPERIMENTS: **15 Hours**
MODULE 1:
1. Implement Array ADT
3. Write the program to perform Linked List, Stack and Queue Operations
4. Write the program to implement Tree Traversal operations
5. Write the program to implement sorting operations
6. Write the program to implement searching operations

MODULE 2:
1. Implement Tower of Honoi Problem using recursion
2. Implement Fibonacci number generation using recursion
3. Implement minimum spanning tree using Prim's, Kruskal's Algorithms
4. Write program to implement all the functions of a dictionary (ADT) using hashing.
5. Given the sequence of integers 5 9 1 7 4 3 2 0 manually arrange this sequence in ascending order using the three "'elementary'" sorting methods: insertion sort, bubble sort and selection sort, showing at each step the new configuration of the sequence. How many comparisons and how many element moves were used by each method? Which is the best performing method for sorting this array of integers? Which would be the worst arrangement of this sequence?

Hardware: Standalone desktops 30 Nos
Software: Turbo C++ compiler or equivalent

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS /-SEMINAR :
1. Decision Tree Approach
2. Networking problems   *Employability*

COURSE OUTCOMES:
On the successful completion of the course, students will be able to

CO1	Understand the concepts of Data structures and Algorithms
CO2	Explain various data structures
CO3	Apply Divide and Conquer & Dynamic programming method to solve different problems
CO4	Apply Greedy and Iterative method to solve different problems
CO5	Analysis various algorithms using various types and methods

REFERENCES:
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014.

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1702IT302	DIGITAL PRINCIPLES AND DESIGN	L	T	P	C
		3	0	2	4

PREREQUISITE :
Basic Electrical and Electronics Engineering

COURSE OBJECTIVES:
Learn how to design digital circuits, by simplifying the Boolean functions. Also, gives an idea about designs using PLDs, and writing codes for designing larger digital systems.

UNIT I   BOOLEAN ALGEBRA AND LOGIC GATES   9 Hours
Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

UNIT II   COMBINATIONAL LOGIC   9 Hours
Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to HDL – HDL Models of Combinational circuits.

UNIT III   SYNCHRONOUS SEQUENTIAL LOGIC   9 Hours
Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters – HDL for Sequential Logic Circuits.

UNIT IV   ASYNCHRONOUS SEQUENTIAL LOGIC   9 Hours
Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards

UNIT V   MEMORY AND PROGRAMMABLE LOGIC   9 Hours
RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices – Application Specific Integrated Circuits.

LIST OF EXPERIMENTS: 15 Hours
1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters.
3. Design and implementation of combinational circuits using MSI devices: 4 – bit binary adder / subtractor Parity generator / checker Magnitude Comparator Application using multiplexers
4. Design and implementation of sequential circuits: Shift –registers - Synchronous and asynchronous counters
5. Coding combinational / sequential circuits using HDL.
6. Design and implementation of a simple digital system
Hardware: 1. Digital trainer kits 30
              2. Digital ICs required for the experiments in sufficient numbers
Software: HDL simulator

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Decision Tree Approach
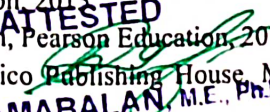2. Networking problems
COURSE OUTCOMES: Skill Development
On the successful completion of the course, students will be able to
CO1   Understand different methods used for the simplification of Boolean functions
CO2   Explain the fundamentals of VHDL / Verilog HDL
CO3   Design and implement combinational circuits
CO4   Design and implement synchronous sequential circuits
CO5   Design and implement asynchronous sequential circuits

REFERENCES:
1. Morris Mano M. and Michael D. Ciletti, "Digital Design", Pearson Education, 2015
2. John F. Wakerly, "Digital Design Principles and Practices", Seventh Edition, Pearson Education, 2015
3. Charles H. Roth Jr, "Fundamentals of Logic Design", Fifth Edition – Jaico Publishing House, Mumbai, 2013.
4. Donald D. Givone, "Digital Principles and Design", Tata Mcgraw Hill, 2013.
5. Kharate G. K., "Digital Electronics", Oxford University Press, 2010
6. http://nptel.ac.in

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1702IT303	PRINCIPLES OF COMMUNICATION	L	T	P	C
		3	0	0	3

PREREQUISITE :
Basic Electrical and Electronics Engineering

COURSE OBJECTIVES:
This course is a graduate level introduction to the basic principles of digital communication systems. A digital communication system is one that transmits a source (voice, video, data, etc.) from one point to another, by first converting it into a stream of bits, and then into symbols that can be transmitted over channels (cable, wireless, storage, etc.). The use of the digital bit-stream as the interface between the source and the channel is universal regardless of what kind of source and channel are involved.

UNIT I   FUNDAMENTALS OF ANALOG COMMUNICATION   9 Hours
Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves

UNIT II   DIGITAL COMMUNICATION   9 Hours
Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III   DIGITAL TRANSMISSION   9 Hours
Introduction, Pulse modulation, PCM sampling, sampling rate, signal to quantization noise rate, companding analog and digital percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

UNIT IV   SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES   9 Hours
Introduction, Pseudonoise sequence, DS spread spectrum with coherent binary PSK, processing ga, FH spread spectrum, multiple access techniques – wireless   communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications

UNIT V   SATELLITE AND OPTICAL COMMUNICATION   9 Hours
Satellite Communication Systems-Keplers Law, LEO and GEO Orbits, footprint, Link model   Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
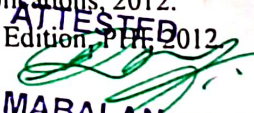1. Mobile Communications
2. Wireless Communications

COURSE OUTCOMES: Employability
On the successful completion of the course, students will be able to

CO1	Understand the concepts of analog communication techniques
CO2	Understand the concepts of digital communication techniques
CO3	Explain various digital communication techniques with keying principles
CO4	Analyze the performance Spread Spectrum and multiple access techniques
CO5	Explain satellite and optical communication

REFERENCES:
1. Wayne Tomasi, " Advanced Electronic Communication Systems", Pearson Education, 2016.
2. Simon Haykin, "Communication Systems", 7th Edition, John Wiley & Sons. 2012.
3. H.Taub, D L Schilling ,G Saha ,"Principles of Communication"3/e,2011.
4. B.P.Lathi,"Modern Analog And Digital Communication systems", 3/e, Oxford University Press, 2012
5. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2012.
6. Martin S.Roden, "Analog and Digital Communication System", 5th Edition, PHI, 2012
7. http://nptel.ac.in
8. http://coursera.org

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1702IT304	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE :
-

COURSE OBJECTIVES:
1. To make students understand the basic structure and operation of digital computer.
2. To study the concepts of pipelining.
3. To expose the students to the concept of parallelism
4. To familiarize the students with hierarchical memory system including cache memories and virtual memory.

UNIT I   STRUCTURE OF COMPUTERS & MACHINE INSTRUCTION   9 Hours
Introduction, Technologies for building Processors and Memory, Performance, The Power Wall, Operations of the Computer Hardware, Operands of the Computer Hardware, Signed and Unsigned numbers, Representing Instructions in the Computer, Logical Operations, Instructions for Making Decisions, Supporting Procedures in Computer Hardware, Communicating with People.

UNIT II   PROCESSING UNIT   9 Hours
MIPS Addressing for 32-Bit Immediate and Addresses, Parallelism and Instructions: Synchronization, Translating and Starting a Program, Addition and Subtraction, Multiplication, Division, Floating Point, Parallelism and Computer Arithmetic: Sub word Parallelism, Real Stuff: Streaming SIMD Extensions and Advanced Vector Extensions in x86.

UNIT III   PIPELINING   9 Hours
Logic Design Conventions, Building a Datapath, A Simple Implementation Scheme, An overview of Pipelining, Pipelined Datapath and Control, Data Hazards: Forwarding versus Stalling, Control Hazards, Exceptions, Parallelism via Instructions, Real Stuff: The ARM Cortex – A8 and Intel Core i7 Pipelines, Going Faster: Instruction –Level Parallelism and Matrix Multiply. An Introduction to Digital Design Using a Hardware Design Language to Describe and Model a Pipeline.

UNIT IV   MEMORY   9 Hours
Memory Technologies, the Basics of Caches, Measuring and Improving Cache Performance, dependable memory hierarchy, Virtual Machines, Virtual Memory, A Common Framework for Memory Hierarchy, Using a Finite- State Machine to Control a Simple Cache, Parallelism and Memory Hierarchy: Redundant Arrays of Inexpensive Disks, Advanced Material: Implementing Cache Controllers, Real Stuff: The ARM Cortex-A8 and Intel Core i7 Memory Hierarchies, Going Faster: Cache Blocking and Matrix Multiply.

UNIT V   DISK STORAGE   9 Hours
Disk Storage and Dependability-RAID levels-hardware multi threading-clusters- message passing multiprocessors-Multiprocessors network topologies.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Introduction to Multi Core Programming
2. Working principles of Intel and AMD Processor

COURSE OUTCOMES: Skill Development
On the successful completion of the course, students will be able to

CO1	Understand the concepts of structure of computers and machine instructions
CO2	Explain the concepts of processing units
CO3	Design and analyze pipelined control units
CO4	Evaluate performance of memory systems
CO5	Understand disk storage and apply RAID concepts in real time problems

REFERENCES:

1. David A. Patterson and John L. Hennessey, "Computer organization and design, The Hardware/Software interface", Morgan Kauffman / Elsevier, Fifth edition, 2014.

2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", 5th Edition, Tata McGraw Hill, 2013.

3. William Stallings, —Computer Organization and Architecture – Designing for Performancel, Sixth Edition, Pearson Education, 2013.

4. V.P. Heuring, H.F. Jordan, —Computer Systems Design and Architectural, Second Edition, Pearson Education, 2015.

5. Behrooz Parhami, —Computer Architecturel, Oxford University Press, 2012.

6. http://nptel.ac.in

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1702CSX02	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
	(Common to B.E CSE and B.Tech IT Programmes)	3	0	0	3

PREREQUISITE:

1. Programming in C
2. Programming in C++

COURSE OBJECTIVES:

1. To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
2. To make a study of SQL and relational database design
3. To know about data storage techniques a query processing.
4. To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.
5. To familiarize the students with the different types of databases.

UNIT I   INTRODUCTION   **9 Hours**

Introduction to database - Data Base Architecture - Data Independence - Functional Dependencies — Relational Algebra-Entity relationship model - mapping cardinalities-keys, E-R diagrams.

UNIT II   QUERY LANGUAGE & OPTIMIZATION   **9 Hours**

Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus - SQL — DDL- DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - Views – Constraints – Query processing and optimization- -Normal Forms – 1NF to 5NF-Domain Key Normal Form

UNIT III   TRANSACTION PROCESSING   **9 Hours**

Transaction Processing – Properties of Transactions –Serializability - Concurrency Control-Locking Mechanisms – Time Stamp ordering –Two phase Commit Protocol-Deadlock-Recovery systems-Log-based recovery.

UNIT IV   FILES AND INDEXING   **9 Hours**

O3verview of Physical Storage Media-RAID -File Organization-File operations – Hashing Techniques – Indexing -Single level and Multi-level Indexes-B+ tree Index Files-B tree Index Files.

UNIT V   ADVANCED TOPICS   **9 Hours**

Data warehousing, heterogeneous component systems-Data mining and knowledge discovery-OODBMS-Object Relational Databases –XML Data Base - Cloud based systems – NOSQL introduction -Hbase data model -Database Tuning -Case Study for Design and Manage the Database for any Project.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Advanced Database Technology
2. Data mining and Data warehousing, Data Analytics

COURSE OUTCOMES: Employability

On the successful completion of the course, students will be able to

CO1	Understand the basic concepts of the database and data models
CO2	Illustrate a database using ER diagrams and map ER into Relations and normalize the Relations
CO3	Acquire the knowledge of query evaluation to monitor the performance of the DBMS
CO4	Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems
CO5	Explain the basic concepts of distributed databases, XML and Database Security

REFERENCES:

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition, McGraw Hill, 2017.
2. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2013.
3. Thomas M. Connolly and Carolyn E. Begg, ―Database Systems - A Practical Approach to Design, Implementation, and Management‖, fifth edition, Pearson Education, 2011
4. C.J.Date, A.Kannan and S.Swamynathan, ―An Introduction to Database Systems‖, Eighth Edition, Pearson Education, 2012.
5. Raghu Ramakrishnan, ―Database Management Systems‖, Fourth Edition, McGraw-Hill College Publications, 2015.
6. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012
7. http://nptel.ac.in/

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8. http://coursera.org/

1702CSX52	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
	(Common to B.E CSE and B.Tech IT Programmes)	0	0	2	1

PREREQUISITE:
1. Programming in C
2. Programming in C++

COURSE OBJECTIVES:
1. Learn to create and use a database
2. Be familiarized with a query language
3. Have hands on experience on DDL Commands
4. Have a good understanding of DML Commands and DCL commands
5. Familiarize advanced SQL queries
6. Be exposed to different applications

LIST OF EXPERIMENTS:
1. DDL and DML commands
2. Transaction control commands and aggregate functions
3. Joins and Nested Queries
4. Constraints and Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Cursors and Triggers
7. Embedded SQL
8. Procedures, Functions and Report
9. Database Design and implementation with any one front end tool (Mini Project)
   a. Sample list of Projects
   b. Hospital management
   c. Railway ticket reservation
   d. Student Mark list processing
   e. Employee pay roll processing
   f. Inventory control

REQUIREMENTS: **TOTAL: 45 HOURS**

Hardware:
Standalone desktops 30 Nos. (or) Server supporting 30 terminals or more.

Software:
Front end : Visual Studio or Java or Equivalent
Back end : Oracle / MySQL/ Sql Server DB2 or Equivalent.

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS:
Under MoU with Oracle Academy, a programme Oracle Workforce Development Programme (OWDP) is conducted. In this programme extensive hands-on training on SQL and PL/SQL will be given to students during the Lab sessions.
1. Writing SQL queries for Hierarchical retrieval of data (tree structured data)
2. Querying Data Dictionary static Views
3. Using stored procedures and Functions for implementing object level data security

COURSE OUTCOMES:
On the successful completion of the course, students will be able to

CO1	Design and implement a database schema for a given problem-domain	
CO2	Create and maintain tables using various PL/SQL statements	Skill Development
CO3	Apply Triggers, Views and Embedded SQL commands to solve real time problems	
CO4	Create reports using functions and procedures	
CO5	Apply front end and back end tools for real time projects	Employability

REFERENCES:
1. http://ilearning.oracle.com
2. http://coursera.org/
3. http://nptel.ac.in/
4. DBMS Lab Manual by EGSPEC

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1704GE351	LIFE SKILLS : SOFT SKILLS	L	T	P	C
	(Common to all B.E / B.Tech Degree Programmes)	0	0	2	1

PREREQUISITE :
1. Technical English
2. Communicative English

COURSE OBJECTIVES:
1. To develop the students basic soft skills and enable them to get a job.
2. To develop the students' interpersonal skills and to enable them to respond effectively.
3. To develop the students selling skills and to enable them to apply in their interview process.
4. To develop the students' Corporate Etiquettes and enable them to respond effectively.
5. To develop the students' learning by practice of giving different situations.

UNIT I   INTRODUCTION TO SOFT SKILLS   **6 Hours**

Soft Skills an Overview – Basics of Communication – Body Language – Positive attitude –Improving Perception and forming values – Communicating with others.

UNIT II   TEAM Vs TRUST   **6 Hours**

Interpersonal skills – Understanding others – Art of Listening - Group Dynamics – Networking – Individual and group presentations - Group interactions – Improved work Relationship .

UNIT III   SELLING ONESELF   **6 Hours**

How to brand oneself – social media – job hunting – Resume writing – Group Discussion – Mock G.D - Interview skills – Mock Interview

UNIT IV   CORPORATE ETIQUETTES   **6 Hours**

What is Etiquette – Key Factors – Greetings – Meeting etiquettes – Telephone etiquettes – email etiquettes – Dining etiquettes – Dressing etiquettes – Rest room etiquettes – Life etiquettes.

UNIT V   LEARNING BY PRACTICE   **6 Hours**

1. My family. Myself. 2. Meeting people. Making Contacts. 3. A city. Getting about town. 4. Our flat. Home life.5. Travelling. Going abroad. 6. Going through Customs. 7. At a hotel. 8. Shopping. 9. Eating out. 10. Making a phone call. 11. A modern office.12 Discussing business.

TOTAL: 30 HOURS

ASSSESSMENT PATTERN
1. Two assignments (2 x 25 marks = 50 marks)
2. Pragmatic assessment (50 marks)

COURSE OUTCOMES: *Skill Development*

On the successful completion of the course, students will be able to

CO1   Communicate effectively in their business environment.
CO2   Improve their interpersonal skills which are mandatory in a corporate world.
CO3   Brand themselves to acquire a job.
CO4   Involve in corporate etiquettes.
CO5   Survive in the different situations.

REFERENCES:
1. Dr.K.Alex, _Soft Skills' Third Edition, S.Chand & Publishing Pvt Limited, 2009
2. Aruna Koneru, _Professional Communication' Second Edition, Tata McGraw-Hill Education, 2008
3. D.K.Sarma, _You & Your Career' First Edition, Wheeler Publishing & Co Ltd, 1999
4. Shiv Khera _You Can Win' Third Edition, Mac Millan Publisher India Pvt Limited, 2005

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IV

1701MA401	PROBABILITY AND QUEUEING THEORY	L	T	P	C
	(Common to B.E / B.Tech – CSE, IT)	3	2	0	4

PREREQUISITE:

Engineering Mathematics I
Engineering Mathematics II
Engineering Mathematics III

COURSE OBJECTIVES:

1. To establish the necessary background in basic probability tools and concepts.
2. To provide students with the ability to understand and conduct computer systems modeling and performance analysis.
3. To emphasis on more advance topics that are particularly useful in modeling, such as Markov models and queuing theory.

UNIT I   PROBABILITY AND RANDOM VARIABLES   **12 Hours**

Probability- Conditional probability-Baye's theorem-Discrete and continuous random variables –Expectation- Variance- Moments – Moment generating functions –Real Time Problems

UNIT II   THEORETICAL DISTRIBUTIONS   **12 Hours**

Discrete Distributions: Binomial, Poisson, Geometric - Continuous Distributions: Uniform, Exponential, Normal, Gamma distributions - Application of Distribution in Engineering Problems

Unit III   TWO - DIMENSIONAL RANDOM VARIABLES   **12 Hours**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression

UNIT IV   RANDOM PROCESSES   **12 Hours**

Classification – Stationary process – Markov process - Poisson process – Discrete parameter - Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT V   QUEUEING MODELS   **12 Hours**

Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms- Computer Science Applications - Finite source models - M/G/1 queue – Pollaczek- Khinchine formula - M/D/1 and M/EK/1 as special case

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1.Transformation of random variables.
2.Series queues, Jackson networks.

COURSE OUTCOMES: Skill Development

After completion of the course, Students will be able to

CO1:   Determine the parameters of unpredictable experiments using probability concepts.
CO2:   Construct probabilistic models for observed phenomena through discrete and continuous distributions.
CO3:   Associate the random variables, by designing joint distribution and correlate the random variables.
CO4:   Make use of discrete time Markov chains in probabilistic manner, to model computer systems.
CO5:   Solve the queuing approaches problems using basic characteristics of queuing theory.
CO6:   Utilize the queuing models to minimize the time of service in a queuing system.

REFERENCES:

1. Ibe.O.C., "Fundamental of Applied Probability and random Processes", Elsevier, Ist Indian Reprint, 2007
2. Gross.D and Harris C.M, "Fundamentals of Queuing Theory", Wiley Student Edition, 2004.
3. Robertazzi, "Computer Networks and Systems: Queuing Theory and performance Evaluation", Springer, 3rd Edition, 2006
4. Taha H.A."Operations Research", Pearson education, Asia, 8th Edition, 2007
5. Trivedhi K.S, "Probability and statistics with Reliability, queuing and Computer Science Applications", John Wiley and Sons, 2nd Edition, 2002
6. nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html
7. www.learnerstv.com/Free-maths-video lectures - ltv348-page1.html

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17021T401	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITE :
1. Programming in C++.
2. Java Programming.
3. Database Management Systems.

COURSE OBJECTIVES:
1. Understand the phases in a software project.
2. Understand fundamental concepts of requirements engineering and Analysis Modeling.
3. Learn various testing and maintenance measures.
4. To learn Aspect Oriented Programming Concepts.
5. To outline the need for Software Project Management and to highlight different techniques for software cost estimation and change management.

UNIT I   SOFTWARE PROCESS AND SPECIFICATIONS   9 Hours
Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models, Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management.

UNIT II   SOFTWARE DESIGN   9 Hours
Overview of System Design -System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design-Architectural Design -User Interface Design-Component level .

UNIT III   SOFTWARE IMPLEMENTATION AND TESTING   9 Hours
Software Implementation Techniques: Coding practices-Refactoring- Software testing fundamentals & Techniques: White box testing- Black box testing-Case study- Levels of testing: Unit Testing, Integration Testing – System Testing and Debugging-Regression Testing- Acceptance testing-reverse engineering and re-engineering.

UNIT IV   ASPECT ORIENTED SOFTWARE DEVELOPMENT   9 Hours
AO Design Principles -Separations of Concerns, Subject Oriented Decomposition, Traits, Aspect Oriented Decomposition, Theme Approach, Designing Base and Crosscutting Themes, Aspect-Oriented Programming using Aspect-J.

UNIT V   SOFTWARE PROJECT MANAGEMENT AND CONTROL   9 Hours
Estimation– FP Based, LOC Based, Make/Buy Decision, COCOMO Models - Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking –Process and Project Metrics- Document Preparation and Production- Cost monitoring – Earned Value Analysis – Change control-Software Configuration Management – Managing contracts – Contract Management-Managing people.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
Software Development - Software Testing - Software Quality Assurance - Software Configuration Management.

COURSE OUTCOMES:
After completion of the course, Student will be able to

CO1:   Compare different Process models.   *Employability*

CO2:   Understand different types of requirements and requirement Engineering process.

CO3:   Understand the systematic procedure for software design and deployment.   *Entrepreneurship*

CO4:   Compare and contrast the various testing and maintenance.

CO5:   Understand the concept of change management during development.

CO6:   Explain the basic concepts of AOP.

REFERENCES:
1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Seventh Edition, Mc Graw-Hill International Edition, 2017.
2. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, 2nd ed, Pearson Education, 2014
3. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2015.
4. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2015.
5. AspectJ in Action, Ramnivas Laddad, Manning Publications, 2013
6. Aspect-Oriented Software Development, Robert E. Filman, TzillaElrad, Siobhan Clarke, and Mehmet Aksit, October 2014.
7. http://nptel.ac.in/

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1702IT402	JAVA PROGRAMMING	L	T	P	C
		2	0	4	4

PREREQUISITE:
1. Programming in C & C++.
2. Database Management Systems.

COURSE OBJECTIVES:
1. Enable learners to write Java programming using Object Oriented Programming Concepts
2. Develop Java programming using Event Driven and Strings.
3. Familiar with Swings concepts using Java.
4. Learn to think Java program using real time concepts and paradigms.

UNIT I   CLASSES AND OBJECTS   8 Hours
Object oriented Programming – Objects - Classes – Encapsulation – Methods – Constructor – Java Documents

UNIT II   ARRAYS, STRINGS, INHERITANCE   8 Hours
I/O operations - Arrays – Strings – Inheritance – Interface- Polymorphism

UNIT III   EVENT DRIVEN PROGRAMMING   8 Hours
Packages - Events Handlers - Applets – Swings – Exception

UNIT IV   CONNECTIVITY   8 Hours
ODBD-JDBC – Servlet – JSP – Scripting – Threading

LIST OF EXPERIMENTS:

MODULE – 1   12 Hours
1. Study of key features of the Java language, intro to the Java Development Kit (JDK) and Java Virtual Machine.
2. Play with Data types, keywords, encapsulation, conditional and control statements, looping, branching.
3. Implement Java programming concepts using Classes and Objects.
4. Implement Java programming concepts using Arrays, Inheritance and Interfaces.
5. Perform event handlers program using Java.

MODULE – 2   16 Hours
1. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
2. Develop a simple paint-like program that can draw basic graphical primitives in different dimensions and colors. Use appropriate menu and buttons.
3. Develop a scientific calculator using even-driven programming paradigm of Java.
4. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and Fibonacci number.
5. Develop Mini-Project for Library Automation System using Events, JDBC and Exception Handling.

Requirement for a batch of 30 students
Software:
Operating System: Windows /Linux operating system
Tool: JDK 1.6 (or above)
IDE: Net beans or Eclipse

                                                                    TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
J2EE, J2ME, Mobile Application Development, Software Development.

COURSE OUTCOMES: Employability
After completion of the course, Student will be able to
CO1: Understand the basic concepts of Java Programming.
CO2: Develop Java program using classes, objects, and encapsulation.
CO3: Design Inheritance and Interface using Java.
CO4: Implement Event Handler, JDBC and Exception Handling concepts using Java.
CO5: Create real time application using Java.

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1702IT403	INTERNET OF THINGS	L	T	P	C
		2	4	0	4

PREREQUISITE :
1. Basic Programming Knowledge.
2. Computer Architecture.

COURSE OBJECTIVES:
1. Study the concept of Microprocessor and Microcontrollers.
2. Study what is Internet of Things and learning concepts.
3. Get basic knowledge of RFID technology, sensor technology and satellite technology.
4. Students aware of resource management and security issues in Internet of Things.
5. Study the concept of Internet of Things in the real world scenario.

UNIT I   MICROPROCESSOR AND MICROCONTROLLERS   9 Hours
Evolution of Microprocessors – Architecture of Intel 8085 Microprocessor - Addressing modes - Intel 8086 microprocessor – Microprocessor architecture - Architecture of Intel 8051 microcontroller

UNIT II   EXPERIMENTS USING MICROPROCESSOR AND MICROCONTROLLERS   9 Hours
8085 programs - Arithmetic and Logical operations, Code conversion, Traffic light control, Stepper motor control, Key board and Display interface.
8086 programs - Data block without overlap, Floating Point Operations, Password checking, Print RAM size and system date, Printer status, Serial interface and Parallel interface.
8051 programs - Arithmetic and Logical operations, Square and Cube program, Find 2"s complement of a number Unpacked BCD to ASCII.

UNIT III   INTRODUCTION TO IOT   9 Hours
What is the Internet of Things: History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks: IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities.

UNIT IV   IOT PROTOCOLS   9 Hours
Sensors - Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards.

UNIT V   CASE STUDY   8 Hours
IEEE 802.15.4 – BACNet Protocol– Modbus – KNX – Zigbee Architecture - Software & Management Tools for IoT.

UNIT VI   BUILDING IOT WITH RASPBERRY PI AND GALILEO/ARDUINO   8 Hours
Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services - Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks – path planning – obstacle avoidance technique.

UNIT VII   EXPERIMENTS USING IOT   8 Hours
Home Automation – Cities – Environment – Energy – Retail – Logistics - Agriculture - Industry - Health and Lifestyle - IoT and M2M.

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :   **TOTAL: 60 HOURS**
Raspberry PI and Arduino Tool Kit

COURSE OUTCOMES: Employability
After completion of the course, Student will be able to
CO1: Understand the microprocessor and microcontrollers.
CO2: Apply microprocessor and microcontrollers concepts to solve various problems.
CO3: Explain the concepts of IoT and protocols.
CO4: Illustrate various case studies and protocol architecture.
CO5: Develop a portable IOT using Arduino or equivalent boards and relevant protocols.
CO6: Analyze applications of IOT in real time scenario.

REFERENCES:

1. Romesh Gaonkar , "Microprocessor Architecture, Programming, and Applications with the 8085", Penram International Publishing (India) LTD, 2017.
2. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2014.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2013.
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications. 2017.
5. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer.,2016.
6. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.
7. http://nptel.ac.in
8. http://coursera.org

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17021T404	OPERATING SYSTEMS	L	T	P	C
		3	0	2	4

PREREQUISITE :
1. Programming in C & C++.
2. Database Management Systems
3. Computer Architecture.

COURSE OBJECTIVES:
1. To Study the basic concepts and functions of operating systems.
2. Learn about Processes, Threads and Scheduling algorithms.
3. Understand the principles of concurrency and Deadlocks.
4. Learn various memory management schemes.
5. Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I   INTRODUCTION AND PROCESS MANAGEMENT   9 Hours
Operating system functions and characteristics - historical evolution of operating systems - Different types of Operating Systems - Issues in operating system design. Process abstraction - process address space - process management - system calls, threads - process hierarchy.

UNIT II   CPU SCHEDULING AND DEADLOCK   9 Hours
Levels of scheduling, comparative study of scheduling algorithms – Dead Lock: Characterization, Prevention Detection, Avoidance and Recovery.

UNIT III   CONCURRENT PROCESSES AND MEMORY MANAGEMENT   9 Hours
Critical section problem: Semaphores, monitors, Inter-process communication, message passing - Storage allocation methods, virtual memory concept, demand paging, page replacement algorithms, segmentation, thrashing.

UNIT IV   FILE SYSTEMS AND DEVICE MANAGEMENT   9 Hours
Functions, file access and allocation methods, directory system, file protection mechanisms, implementation issues, file system hierarchy. Hardware organization, device scheduling policies, device drivers.

UNIT V   CASE STUDY   9 Hours
Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen, VMware on Linux Host and Adding Guest OS.

LIST OF PROGRAMS   15 Hours
1. Installing of operating system and resource allocation.
2. Shell Programming: Creating a script, making a script executable, shell syntax (variables, conditions, control structures, functions, commands).
3. Simulate the following CPU scheduling algorithms.
4. Simulate Bankers Algorithm for Dead Lock Avoidance.
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate all file allocation strategies.
7. Process synchronization using semaphores.
8. Simulate all File Organization Techniques.
9. Simulate all page replacement algorithms.
10. Study of Linux OS, Microsoft, Mobile OS.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
Android, iOS

COURSE OUTCOMES: *Employability*
After completion of the course, Student will be able to

CO1: Understand the key concepts of operating system, process and process management
CO2: Implement different CPU scheduling algorithms and investigate their merits
CO3: Explain various deadlock scenarios and apply appropriate prevention techniques
CO4: Implement techniques for synchronization of concurrent processes and memory management approach
CO5: Identify and solve problems related to file system and device management system
CO6: Perform administrative tasks on LINUX servers

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Conceptsǁ, John Wiley & Sons (Asia) Pvt. Ltd, Ninth Edition, 2017.
2. Gary Nutt, ―Operating Systems- A Modern Perspectiveǁ, Pearson Education Pvt. Ltd, Second Edition, 2013.
3. Andrew S. Tanenbaum, ―Modern Operating Systemsǁ, 3rd edition Prentice Hall of India Pvt. Ltd, 2015.
4. Harvey M. Deitel, Operating Systemsǁ, Pearson Education Pvt. Ltd, Third Edition, 2013.
5. William Stallings, Operating Systemǁ, Pearson Education, Sixth edition, 2015.
6. http://nptel.ac.in

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17021T405   **COMPUTER NETWORKS** | L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

PREREQUISITE :
1. Digital Principals and System Design.
2. Principles of Communication.

COURSE OBJECTIVES:
1. Identify the component required to build different types of networks.
2. To learn about the division of network functionalities into layers.
3. Identify solution for each functionality at each layer.
4. Choose the required functionality at each layer for given application.

UNIT I   PHYSICAL AND DATA LINK LAYER   **9 Hours**
Computer Network – OSI Model – Communication Systems – Protocol and Standards – Wired vs Wireless – Data link layer – Error and Flow Control – Hamming Code – MAC - Case study: CSMA/CD & CA, Token Bus, Token Ring, Hub, Bridges.

UNIT II   NETWORK AND TRANSPORT LAYER   **9 Hours**
Internetworking – Virtual and Datagram - IP Address: IPv4, IPv6 – Routing: Link state, Distance vector – UDP – TCP – Case study: Switch, Router.

UNIT III   ROUTING SERVICES   **9 Hours**
Inter domain Routing – RIP – OSPF – BGP – ICMP – ARP – DHCP – Multicast routing.

UNIT IV   APPLICATION LAYER   **9 Hours**
Link Layer Services – Framing – FTP – Web Services - Email – HTTP – DNS.

UNIT V   CASE STUDY   **9 Hours**
IEEE Standards - Blue tooth – Wi-Fi – Network Management – SNMP – SNA – QoS – Congestion Control – Gateway.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
Distributed Computing - Cloud Computing - Network Programming.

COURSE OUTCOMES:
After completion of the course, Student will be able to
CO1: Illustrate the concepts of physical and data link layers   } *Employability*
CO2: Explain the operations of network and transport layers
CO3: Understand various routing services
CO4: Design and implement a networking application incorporating the different layering protocol } *Entrepreneu*
CO5: Simulate various application layers and real time network manage protocols

REFERENCES:
1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A systems approachl, Fifth Edition, Morgan Kaufmann Publishers, 2016.
2. Forouzan, Behrouz A., and Firouz Mosharraf. "Computer networks: a top-down approach", McGraw-Hill, Special Indian Edition 2016.
3. James F. Kurose, Keith W. Ross, —Computer Networking - A Top-Down Approach Featuring the Internetl, Sixth Edition, Pearson Education, 2013.
4. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, —Computer Networks: An Open Source Approachl, McGraw Hill Publisher, 2012.
5. Nader. F. Mir, —Computer and Communication Networksl, Pearson Prentice Hall Publishers, 2015.
6. http://nptel.ac.in.

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1702IT451   **NETWORKS LAB**

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PREREQUISITE :
Programming Knowledge.

COURSE OBJECTIVES:
The students should be made to learn about the low-level network programming concepts using APIs and Simulation tools.

LIST OF EXPERIMENTS:
1. Write a network application program.
2. Use tools to visualize packet flow
3. Configure Router/Switch to set up network (network administration)
4. Simple Chat Program using TCP Sockets
5. Simulation of HTTP Protocol using TCP Sockets
6. Simulation of Sliding Window Protocol using TCP Sockets
7. Simulation of DNS using UDP Sockets
8. Simulation of Ping using Raw Sockets
9. Learn to use commands like TCP Dump, Netstat, Trace Route
10. Study of TCP/UDP performance using simulation tool
11. Simulate networks using network simulators like NS-2
12. Performance comparison of MAC protocols using simulation tool
13. Performance comparison of Routing protocols using simulation tool

Requirement for a batch of 30 students
JDK1.6 or Equivalent,
Network Simulator - 2

TOTAL: 45 HOURS

ADDITIONAL EXPERIMENTS/ INNOVATIVE EXPERIMENTS:
J2EE, J2ME, Mobile Application Development, Software Development

COURSE OUTCOMES:
After completion of the course, Student will be able to
CO1: Apply and Configure the network using TCP and UDP.   *Employability*
CO2: Simulate various TCP sockets program.   *Skill Development*
CO3: Simulate various UDP sockets program.
CO4: Compare and Contrast performance of MAC and Routing protocols.   *Skill development*

REFERENCES:
1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A systems approachl, Fifth Edition, Morgan Kaufmann Publishers, 2016
2. Forouzan, Behrouz A., and Firouz Mosharraf. "Computer networks: A top-down approach", McGraw-Hill, Special Indian Edition 2016.
3. James F. Kurose, Keith W. Ross, —Computer Networking - A Top-Down Approach Featuring the Internetl, Sixth Edition, Pearson Education, 2013.
4. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, —Computer Networks: An Open Source Approachl, McGraw Hill Publisher, 2012.
5. Nader. F. Mir, —Computer and Communication Networksl, Pearson Prentice Hall Publishers, 2015.
6. http://nptel.ac.in.
7. www.vlab.co.in/broad-area-computer-science-and-engineering.

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1704GE451	LIFE SKILLS: VERBAL ABILITY	L	T	P	C
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PREREQUISITE:
Technical English – I and II

COURSE OBJECTIVES:
1. To help students comprehend and use vocabulary words in their day to day communication.
2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings.
3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production.
4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice.
5. To apply the principles of effective business writing to hone communication skills.

UNIT I   VOCABULARY USAGE   6 Hours
Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

UNIT II   COMPREHENSION ABILITY   6 Hours
Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages.

UNIT III   BASIC GRAMMAR AND ERROR DETECTION   6 Hours
Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

UNIT IV   REARRANGEMENT AND GENERAL USAGE   6 Hours
Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

UNIT V   APPLICATION OF VERBAL ABILITY   6 Hours
Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

                                                                    Total: 30 Hours

ASSESSMENT PATTERN
1. Two assignments (2 x 25 marks = 50 marks)
2. Pragmatic assessment (50 marks)   *Skill Development*

COURSE OUTCOMES:
After completion of the course, Student will be able to
CO1: Use new words in their day to day communication.
CO2: Gather information swiftly while reading passages.
CO3: Students are proficient during their oral and written communication.
CO4: Rearrange the sentences and able to identify the voice of the sentence.
CO5: Students use their knowledge of the best practices to craft effective business documents

REFERENCES:
1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017.
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English, S.Chand Publishing House, 2017.
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014.
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition, 2007.

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		L	T	P	C
17021T501	OBJECT ORIENTED ANALYSIS AND DESIGN	3	0	0	3

PREREQUISITE:
1. Software Engineering and Project Management.

COURSE OBJECTIVES:
1. Learn the basics of OO analysis and design skills.
2. Learn the UML design diagrams.
3. Learn to map design to code.
4. Be exposed to the various testing techniques.

9Hours

UNIT I   UML DIAGRAMS
Introduction to OOAD – Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams

9 Hours

UNIT II   DESIGN PATTERNS
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller - Design Patterns – creational - factory method - structural – Bridge – Adapter - behavioral – Strategy – observer

9 Hours

UNIT III   CASE STUDY
Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases –include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition

9 Hours

UNIT IV   APPLYING DESIGN PATTERNS
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams – UML interaction diagrams - Applying GoF design patterns

9 Hours

UNIT V   CODING AND TESTING
Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing –GUI Testing – OO System Testing.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Software Development.
2. Software Design.

Course Outcomes:
At the end of this course, students will be able to,
CO1: Design and implement projects using OO concepts   *Entrepreneurship*
CO2: Use the UML analysis and design diagrams
CO3: Apply appropriate design patterns
CO4: Create code from design   *Employability*
CO5: Compare and contrast various testing techniques

REFERENCES:
1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2016.
2. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2012.
3. Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 2012.
4. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2013.
5. Paul C. Jorgensen, "Software Testing:- A Craftsman"s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.
6. http://nptel.ac.in/

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	L	T	P	C
DISTRIBUTED COMPUTING	3	0	0	3

17021T502

PREREQUISITE:
    1. Computer Networks

COURSE OBJECTIVES:
    1. To provide knowledge on principles underlying the design of distributed systems
    2. To lay the foundations of Distributed Systems.
    3. To introduce the idea of Distributed Architecture.
    4. To introduce the idea of Distributed operating system and related issues.

9 Hours

UNIT I   BASIC CONCEPTS

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models– Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles- Internet Protocols

9 Hours

UNIT II   INTERPROCESS COMMUNICATION AND DISTRIBUTED OBJECTS

Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling –Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation– Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications.

9 Hours

UNIT III   DISTRIBUTED TRANSACTIONS AND CONCURRENCY CONTROL

Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions – Distributed Deadlocks - Transaction Recovery

9 Hours

UNIT IV   RESOURCE MANAGEMENT

Time and Global States-Introduction-Clocks, Events and Process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging-Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections Algorithm- Multicast communication-Consensus and related problems

9 Hours

UNIT V   DISTRIBUTED FILE SYSTEM AND NAME SERVICES

Distributed File Systems-Introduction-File service architecture-Network File System- Name Services – introduction -Name Services and the Domain Name System-Directory Services.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
    1. Cloud Computing.
    2. Service Oriented Architecture.
    3. Deep Learning.

Course Outcomes: *Employability*
At the end of this course, students will be able to,
    CO1: Articulate the principles and standard practices underlying the design of distributed systems.
    CO2: Explain the core issues of distributed systems.
    CO3: Appreciate the difficulties in implementing basic communication in distributed systems.
    CO4: Have knowledge on the substantial difficulty in designing distributed algorithms in comparison to centralized algorithms.
    CO5: Appreciate the issues in distributed operating system, resource management and distributed file system.

REFERENCES:
1. George Coulouris, Jean Dollimore, Tim Kindberg, —Distributed Systems Concepts and Designl, Seventh Edition, Pearson Education Asia, 2016.
2. Introduction to Parallel Computing, Second Edition, AnanthGrama, Anshul Gupta, George arypis, Vipin Kumar,: Addison Wesley 2013
3. Ajay D. Kshemkalyani and MukeshSinghal, —Distributed Computing: Principles, Algorithms and Systemsl, Cambridge Press. 2014
4. A.S.Tanenbaum, M.Van Steen, —Distributed Systemsl, Pearson Education, 2012.
5. M.L.Liu, —Distributed Computing Principles and Applicationsl, Pearson Addison Wesley, 2014.
6. Tom White, —Hadoop: The Definitive Guidel, O'REILLY Media, 2011.
7. http://nptel.ac.in/

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		L	T	P	C
17021T503	COMPUTER GRAPHICS AND MULTIMEDIA	3	0	2	4

PREREQUISITE:

Engineering Graphics, Computer Programming

COURSE OBJECTIVES:
1. Provide in-depth knowledge of display systems, image synthesis and shapes.
2. Understand basic concepts related to Multimedia including data standards, algorithms and software.
3. Develop multimedia applications by utilizing existing libraries.

UNIT I   GRAPHICS FUNDAMENTALS   **9 Hours**

Introduction-Line Circle and Ellipse Drawing Algorithm-Attribute-Two dimensional geometric transformation-Two dimensional Clipping and Viewing

UNIT II   TWO DIMENSIONAL GRAPHICS   **9 Hours**

Two dimensional geometric transformations - Matrix representations and homogeneous co ordinates, composite transformations: window to-viewport coordinate transformation, Two dimensional viewing functions: clipping operations-Point Clipping - Line Clipping: Cohen Sutherland, Liang Barsky -Polygon Clipping: Sutherland Hodgeman

UNIT III   THREE DIMENSIONAL GRAPHICS   **9 Hours**

3D concepts and object representation:3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bezier curves and surfaces, B-spline curves and surfaces.

3D transformation and viewing:3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations.

UNIT IV   ANIMATION   **9 Hours**

Text: Using Text in Multimedia, computer and text, Font Editing and design tools, hypermedia and hypertext - Image: Making Still Images, color, Image File format, Principles of Animation, animation by computer, making animation - Video: Digital video containers, shooting and editing video.

UNIT V   MULTIMEDIA   **9 Hours**

Basic software tools - Text, image, and sound editing tools - painting and drawing tools, animation tools - making instant multimedia - Office suite - Multimedia authoring tools: Types and page based authoring tools, icon and time based authoring tools.

                                                                                      15 Hours
List of Experiments:
1. Implementation of Line, Circle, Ellipse drawing Using DDA Algorithm and Bresenham Algorithm
2. Implementation of 2D Transformations
3. Implementation of 3D Transformations
4. Implementation of Line Clipping Algorithm
5. Use of various Photo editing tool to solve real time problems and apply various effects
6. Use of various Animation tools to solve real time problems and apply various effects
7. To perform a morphing effect of crying face to sad face to happy face and last to most happiest face.
8. Use of Open GL tool to perform Animation and Virtual Reality effects.

                                                                                      TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Computer Vision.
2. Visualization Techniques.

Course Outcomes: Entrepreneurship
At the end of this course, students will be able to,
CO1: Apply 2D graphics and algorithms to real world applications
CO2: Create interactive graphics applications using 3D modeling and transformation techniques
CO3: Understand the processes involved in the development of a multimedia product from client brief through to delivery
CO4: Plan and create a multimedia product that includes animation, audio and video

REFERENCES:
1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics; Principles and practice; Second Edition in C;. Addison Wesley, 2016

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2. Computer Graphics - C version; D. Hearn and M. P. Baker; Pearson Education, 2014.

3. Computer Graphics - OpenGL version; D. Hearn and M. P. Baker; Pearson Education, 2015

4. K. Andleigh, KiranThakrar , Multimedia Systems Design, PHI, 2012

5. ZeNian Li, S. Drew, "Fundamentals of Multimedia", PHI, 2012.

6. Donald Hearn and M Pauline Baker, Computer Graphics, Pearson Education, 2nd Edition, 2013.

7. http://nptel.ac.in/

17021T504	WEB PROGRAMMING	L	T	P	C
		3	0	2	4

PREREQUISITE:
1. Programming in Java Programming.
2. Database Management Systems

COURSE OBJECTIVES:
1. To understand the concept of client / server programming
2. To apply web programming languages for developing web applications
3. To know the unique features of scripting languages

UNIT I   WEB ESSENTIALS 9 Hours

Internet – Web clients – Web servers – Markup languages – Introduction to XHTML-Editing XHTML-Headings-Linking –Tables-Images-Forms-Internal linking – Frames - Lists- Cascading Style Sheets (CSS): Features-Style rule cascading and inheritance - Text properties –CSS box model.

UNIT II   CLIENT SIDE PROGRAMMING 9 Hours

Client side vs. Server side programming languages - Introduction to java script –Control statements I - Control statements II - Functions- Objects – Arrays – PHP Programming

UNIT III   SERVER SIDE PROGRAMMING 9 Hours

Java servlet: Architecture – Servlet life cycle -Simple programs using java servlet– Parameter data – Sessions – Cookies – Other servlet capabilities –Data storage –Servlet and concurrency- JDBC- Connecting a java servlet program to a database

UNIT IV   XML AND WEB SERVICES 9 Hours

XML Namespaces-DTD and XML schema-XML parsers: DOM vs. SAX-XSLT – Xquery - XPath- JSP - Running JSP applications – Java beans classes and JSP - Web services concepts - Web services for clients – WSDL – Representing data types: XML schema – SOAP - J2EE

LIST OF EXPERIMENTS 24 HOURS

1. Write a html program for Creation of web site with forms, frames, links, tables etc

2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images,

3. Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page

4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.

5. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.

6. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.

7. Using CSS for creating web sites

8. Creating simple application to access data base using JDBC Formatting HTML with CSS.

9. Program for manipulating Databases and SQL.

10. Program using PHP database functions.

11. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work

12. Install Tomcat and use JSP and link it with any of the assignments above

13. Reading and Writing the files using .Net

14. Write a program to implement web service for calculator application

15. Implement RMI concept for building any remote method of your choice.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
1. Software Development

2. Mobile Application Development

Course Outcomes

At the end of this course, students will be able to,

CO1: Design web pages using HTML and CSS } *Entrepreneurship*
CO2: Develop web pages using java script
CO3: Develop server side programming techniques to solve real time application
CO4: Apply database concept to create interactive web pages   } *Employability*
CO5: Apply JSP concepts to solve real time applications
CO6: Understand the basic concept of web services

REFERENCES:

1. Jeffrey C Jackson, Web Technology – A computer Science perspective, Person Education, New Delhi, 2016.
2. Frank. P. Coyle, XML, Web Services and the Data Revolution, Addison-Wesley Professional, 2012.
3. Chris Bates, Web Programming – Building Internet Applications, Wiley India, 2013.
4. Deitel, Deitel and Neito, Internet and World wide web – How to program, Pearson education, New Delhi, 2016.
5. Gopalan. N.P, Web Technology A Developer Perspectives, PHI, 2012 **ATTESTED**
6. H.M.Deitel, P.J.Deitel, T.R.Nieto, T.M.Lin, XML How to Program, Pearson Education,2012
7. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, Developing Java Web Services, Wiley Publishing Inc., 2011.
8. Steve Graham and Doug Davis, Building Web services with Java, Pearson Education 2011
9. http://nptel.ac.in/
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11. http://tutorialpoint.org

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17041T551	CASE TOOLS (MINI PROJECT 1)	L	T	P	C
		0	0	2	1

PREREQUISITE :
Software Engineering and Project Management

COURSE OBJECTIVES:
1. Learn the basics of OO analysis and design skills.
2. Be exposed to the UML design diagrams.
3. Learn to map design to code.
4. Be familiar with the various testing techniques

TO DEVELOP A MINI-PROJECT USING FOLLOWING PROBLEM STATEMENTS

1. Identify Use Cases and develop the Use Case model.
2. Identify the conceptual classes and develop a domain model with UML Class diagram.
3. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
4. Draw relevant state charts and activity diagrams.
5. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
6. Develop and test the Technical services layer.
7. Develop and test the Domain objects layer.
8. Develop and test the User interface layer.

TOTAL:45 HOURS

REQUIREMENTS:
Argo UML or Eclipse IDE or Rational Suite or Visual Paradigm or equivalent

ADDITIONAL EXPERIMENTS/ INNOVATIVE EXPERIMENTS:
1. Commercial building like sky scrapers
2. Domed structures

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Design and implement projects using OO concepts. *Skill Development*
CO2: Use the UML analysis and design diagrams. *Entrenewship*
CO3: Apply appropriate design patterns.
CO4: Create code from design. *Employability*
CO5: Compare and contrast various testing techniques

REFERENCES:

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2016.
2. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using

UML", Fourth Edition, Mc-Graw Hill Education, 2012.

3. Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 2012.

4. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2013.

5. Paul C. Jorgensen, "Software Testing:- A Craftsman"s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.

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1704GE551	LIFE SKILLS: APTITUDE – I	L	T	P	C
		0	0	2	1

PREREQUISITE :
Technical English – I and II

COURSE OBJECTIVES:
1. To brush up problem solving skill and to improve intellectual skill of the students
2. To be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors
3. To be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
4. To enhance analytical ability of students
5. To augment logical and critical thinking of Student

Unit I	Introduction to Number System, Basic Shortcuts of addition, Multiplication, Division	6 Hours

Classification of numbers – Types of Numbers - Divisibility rules - Finding the units digit - Finding remainders in divisions involving higher powers - LCM and HCF Models - Fractions and Digits – Square, Square roots – Cube, Cube roots – Shortcuts of addition, multiplication, Division.

Unit II	Ratio and proportion, Averages	6 Hours

Definition of Ratio - Properties of Ratios - Comparison of Ratios - Problems on Ratios - Compound Ratio - Problems on Proportion, Mean proportional and Continued Proportion Definition of Average - Rules of Average - Problems on Average - Problems on Weighted Average - Finding average using assumed mean method.

Unit III	Percentages, Profit And Loss	6 Hours

Introduction Percentage - Converting a percentage into decimals - Converting a Decimal into a percentage - Percentage equivalent of fractions - Problems on percentages - Problems on Profit and Loss percentage- Relation between Cost Price and Selling price - Discount and Marked Price - Two different articles sold at same Cost Price - Two different articles sold at same Selling Price - Gain% / Loss% on Selling Price.

Unit IV	Coding and decoding, Direction sense	6 Hours

Coding using same set of letters - Coding using different set of letters - Coding into a number - Problems on R-model - Solving problems by drawing the paths - Finding the net distance travelled - Finding the direction - Problems on clocks - Problems on shadows - Problems on direction sense using symbols and notations.

Unit V	Number and letter series Number and Letter Analogies, Odd man out	6 Hours

Difference series - Product series - Squares series - Cubes series - Alternate series - Combination series - Miscellaneous series - Place values of letters - Definition of Analogy - Problems on number analogy - Problems on letter analogy - Problems on verbal analogy - Problems on number Odd man out - Problems on letter Odd man out - Problems on verbal Odd man out

Total: 30 Hours

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :
Verbal Reasoning, Non-Verbal Reasoning, Quantitative and Qualitative Apptitude

COURSE OUTCOMES: Skill Development
At the end of the course, the student should be able to
CO1: Learners should be able to understand number and solving problems least time using various shortcut
CO2: Solve problems on averages; compare two quantities using ratio and proportion.
CO3: Calculate concept of percentages, implement business transactions using profit and loss.
CO4: Workout concepts of Coding and Decoding, ability to visualize directions and understand the logic behind a sequence.
CO5: Learners should be able to find a series the logic behind a sequence.

REFERENCES:
1. Arun Sharma, „How to Prepare for Quantitative Aptitude for the CAT", 7th edition, McGraw Hills publication, 2016.
2. Arun Sharma, „How to Prepare for Logical Reasoning for CAT", 4th edition, McGraw Hills publication, 2017.
3. R S Agarwal, „A modern approach to Logical reasoning", revised edition, S.Chand publication, 2017.
4. R S Agarwal, „Quantitative Aptitude for Competitive Examinations" revised edition, S.Chand publication, 2017.
5. Rajesh Verma, "Fast Track Objective Arithmetic" S.Chand Publication 2018.

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6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihnat publication, 2014.

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17041T552	TECHNICAL SEMINAR		0	0	2	1

COURSE OBJECTIVES: *Skill Development*

1. To develop the self-learning skills to utilize various technical resources available from multiple field.
2. To promote the technical presentation and communication skills.
3. To impart the knowledge on intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.

The students are expected to make two presentations on advanced topics (recent trends) related to III or IV semester subjects. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also. Students are encouraged to use various teaching aids such as power point presentation and demonstrative models.

TOTAL: 45 HOURS

ASSESSMENT PATTERN :

Continuous Assessment (100 Marks)

Distribution of marks for Continuous Assessment	Marks
Presentation I	40
Report	10
Presentation II	40
Report	10
Total	100

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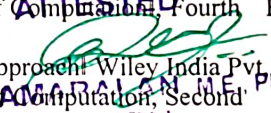.Pillay Engineering College.
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17031T003	ARTIFICIAL INTELLIGENCE	L	T	P	C
		3	0	0	3

AIM: The main objective of this course is to understand the concepts of Artificial Intelligence and Computer vision.

PREREQUISITE: Computer Networks, Software Engineering and Project Management

COURSE OBJECTIVES:

1. Study the concepts of Artificial Intelligence.
2. Learn the methods of solving problems using Artificial Intelligence.
3. Introduce the concepts of Expert Systems and machine learning.

UNIT I	INTRODUCTION TO AI	9 Hours

Artificial Intelligence – Problem Solving – Production Systems – Algorithms Analysis – Searching Techniques – Case Study: Constraint Statisfication Problem, Hill Climbing

UNIT II	KNOWLEDGE REPRESENTATION	9 Hours

Knowledge Representation – Predicate Calculus – Inference – Forward & Backward Chaining – Bayes Theory – Fuzzy Approach – Case Study: Game Playing

UNIT III	PLANNING	9 Hours

Basic Plan generation – Strips Language – Scheduling - Explanation – Case Study: Graph Coloring, Reactive Systems

UNIT IV	MACHINE LEARNING	9 Hours

Machine Learning Techniques – Types – Approaches – Applications – Case Study: Ontology, Deep Learning

UNIT V	EXPERT SYSTEMS	9 Hours

Expert systems - Architecture of expert systems, Roles of expert systems – Case Study: Recommendation Systems, Smart GRID, Industrial Internet Search Engines, Social Semantics, Natural Language Processing

		TOTAL:	45 Hours

FURTHER READING: Machine Vision Systems, Real Time Learning and Decision making systems

COURSE OUTCOMES — Employability

At the end of this course, students will able to,

CO1: Understand the basic of Artificial Intelligence and Problem Solving
CO2: Apply various knowledge representation in solve problems
CO3: Explain various planning techniques and case studies
CO4: Understand different machine learning techniques and case studies
CO5: Explain various expert system applications

REFERENCES:

1. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill- 2016.
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2012.
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2010.
4. Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2013.
5. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.
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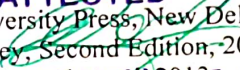| 17031T004	THEORY OF COMPUTATION	L	T	P	C
		3	0	0	3

AIM: To provide an understanding of the theoretical development of computer science, particularly for finite representations of languages and machines.

PREREQUISITE: Engineering mathematics, Problem Solving Techniques

COURSE OBJECTIVES:

1. Construct finite state machines and the equivalent regular expressions.
2. Prove the equivalence of languages described by finite state machines and regular expressions.
3. Construct pushdown automata and the equivalent context free grammars
4. Construct Turing machines and Post machines.
5. Be aware of Decidability and Un-decidability of various problems.
6. Learn types of grammars

UNIT I	AUTOMATA THEORY	9 Hours

Abstract machines and computation, formal languages and grammars, finite state machines- Deterministic Finite Automata (DFA) - Non-deterministic Finite Automata (NFA) -Equivalence of DFA and NFA- NFA to DFA conversion-Minimization of DFA.

UNIT II	REGULAR EXPRESSIONS AND LANGUAGES	9 Hours

Regular Expression (RE) - Converting Regular Expression to FA- Converting FA to Regular Expression -Proving languages not to be regular – Closure and Decision properties of Regular Expression - Equivalence and minimization of Automata.

UNIT III	CONTEXT FREE GRAMMARS AND PUSH DOWN AUTOMATA	9 Hours

Context-free grammars-Ambiguity in grammars and languages-simplification of content-free grammars, Pushdown automata, deterministic and non-deterministic pushdown automata and their equivalence with context free languages -Chomsky normal form, Greibach normal form- Closure properties of context-free languages.

UNIT IV	TURING MACHINES	9 Hours

Turing machines, computable languages and functions, modifications of Turing machines, Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomsky hierarchy of languages.

UNIT V	UNSOLVABLE PROBLEMS	9 Hours

Recursive, and recursively enumerable languages; Undecidability, notion of reduction-Undecidable Problems about Turing Machines – Post's Correspondence Problem

	TOTAL:	45 Hours

FURTHER READING: Machine Vision Systems, Real Time Learning and Decision making systems

COURSE OUTCOMES

At the end of this course, students will able to,

CO1: Explain automata theory as the basis of all computer science languages design
CO2: Construct automata for regular expression and perform minimization of automata
CO3: Perform simplification in grammars and build normalized grammars
CO4: Construct Push Down Automata for a simple Application.
CO5: Construct Turing Machine for a simple Application
CO6: Explain Undecidable problems and measure complexity.

REFERENCES:

1. J.E.Hopcroft, R.Motwani and J.D Ullman, —Introduction to Automata Theory, Languages and Computations‖, Third Edition, Pearson Education, 2016
2. John C.Martin, —Introduction to Languages and the Theory of Computation‖ Fourth Edition, Tata McGraw Hill, 2012.
3. Kavi Mahesh, —Theory of Computation, A Problem-solving Approach‖ Wiley India Pvt Ltd, 2012.
4. H.R.Lewis and C.H.Papadimitriou, —Elements of Theory of Computation, Second Edition, Pearson Education/PHI, 2013.
5. Peter Linz, "An Introduction to Formal Language and Automata", Third Edition, Narosa Publishers, New Delhi, 2012.
6. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata. Theory and Computation", Pearson Education 2009
7. http://nptel.ac.in

17031T005	SOFTWARE TESTING METHODS AND TOOLS	L	T	P	C
		3	0	0	3

AIM: The main objective of this course is used to introduce the concepts of software testing & its levels and automated testing tools

PREREQUISITE: Software Engineering and Project Management

COURSE OBJECTIVES:

1. To know the behavior of the testing techniques to detect the errors in the software
2. To understand standard principles to check the occurrence of defects and its removal.
3. To learn the functionality of automated testing tools
4. To understand the models of software reliability

UNIT I	TESTING ENVIRONMENT AND TEST PROCESSES	9 Hours

World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analysing and Reporting Test Results

UNIT II	TESTING TECHNIQUES AND LEVELS OF TESTING	9 Hours

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques

UNIT III	INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES	9 Hours

Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software –Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT IV	TEST AUTOMATION	9 Hours

Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT V	SOFTWARE TESTING AND QUALITY METRICS	9 Hours

Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

	TOTAL:	45 Hours

FURTHER READING: Case study of Testing tools like Rational Robot, Amazon Tools

COURSE OUTCOMES

At the end of this course, students will able to,
   CO1: Explain the software by applying testing techniques to deliver a product free from bugs
   CO2: Evaluate the web applications using bug tracking tools.   *Employability*
   CO3: Investigate the scenario and the able to select the proper testing technique
   CO4: Explore the test automation concepts and tools
   CO5: Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
   CO6: Evaluate the estimation of cost, schedule based on standard metrics   *Entrenewiship*

REFERENCES:
1. William Perry, "Effective Methods of Software Testing", Third Edition, Wiley Publishing 2015
2. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2014.
3. NareshChauhan, "Software Testing Principles and Practices" Oxford University Press, New Delhi, 2014.
4. Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, Second Edition, 2012.
5. LleneBurnstein, " Practical Software Testing", Springer International, 2003.
6. RenuRajani,Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2010
7. http://nptel.ac.in/

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PROFESSIONAL ELECTIVE – II

17031T006	MULTICORE PROGRAMMING	L	T	P	C
		3	0	0	3

AIM: This course is provide the advance concepts of process and controllers

PREREQUISITE: Computer Organization and Architecture

COURSE OBJECTIVES:
1. Understand the recent trends in the field of computer architecture and identify performance related parameters
2. Appreciate the need for parallel processing
3. Understand the challenges in parallel and multi-threaded programming
4. To understand the different types of multicore architectures

UNIT I	INTRODUCTION TO MULTICORE PROCESSORS	9 Hours

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models – Symmetric and distributed shared memory architectures – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture.

UNIT II	PARALLEL PROGRAMMING	9 Hours

Performance Issues – Scalability – Synchronization and data sharing – Data races – Synchronization primitives (mutexes, locks, semaphores, barriers) – deadlocks and live locks communication between threads (condition variables, signals, message queues and pipes).

UNIT III	OPEN MP PROGRAMMING	9 Hours

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and live locks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV	MPI PROGRAMMING	9 Hours

MPI Model – MPI constructs – MPI Library –Point-to-point and Collective communication – data decomposition – communicators and topologies – MPI derived data types – Performance evaluation

UNIT V	MULTITHREADED APPLICATION DEVELOPMENT	9 Hours

Case studies – n-Body solvers – Tree Search – OpenMP and MPI implementations and comparison – Algorithms, program development and performance tuning.

	TOTAL:	45 Hours

FURTHER READING: Case study of Testing tools like Rational Robot, Amazon Tools

COURSE OUTCOMES

Employability

At the end of this course, students will be able to,

CO1: Identify the limitations of ILP and the need for multicore architectures

CO2: Discuss the issues related to multiprocessing and suggest solutions

CO3: Solve problems in Parallel Processors

CO4: Explain MPI Programming and topologies

CO5: Develop programs using OpenMP and MPI.

REFERENCES:

1. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2016.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Macgraw Hill, 2013.
3. Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan Kaufmann/Elsevier, 2011.
4. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2011.
5. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/software approach" , Morgan Kaufmann/Elsevier Publishers, 2012.
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17021T601	C# AND .NET	L	T	P	C
		2	0	4	4

PREREQUISITE:
1. Programming in C, C++, Java Programming

COURSE OBJECTIVES:
1. Enable learners to write C# program using Object Oriented Programming Concepts.
2. Be familiar with .NET concepts.
3. Learn to think develop real time.NET applications.

UNIT I   INTRODUCTION TO C#   **9Hours**
C# Programming Basics – Data types – Variables – Expressions – Operators – Conditional & Control Statements – Looping –Boxing & Unboxing.

UNIT II   OBJECT ORIENTED PROGRAMMING   **9 Hours**
Classes – Objects – Constructors – Inheritance – Polymorphism – Event Handling – Threading – Exception Handling.

UNIT III   APPLICATION DEVELOPMENT ON .NET   **9 Hours**
Building Windows Applications – Forms – Menu – Dialog Box – Data Set – ADO.NET – SQL Server Connectivity.

UNIT IV   WEB APPLICATION DEVELOPMENT ON .NET   **9 Hours**
Programming using ASP.NET – XML – Virtual Applications – Session Management – Web.Config – Web Services – Versioning – Marshalling – Security.

LIST OF EXPERIMENTS: **24 Hours**
Module – 1:   **10 Hours**
1. Study of C# and .NET frame work installation, configuration and running.
2. Wire C# program using Data types, Variables, Operators, Conditional & Control Statements, Looping, Boxing & Unboxing.
3. Develop C# program using class, object, inheritance, polymorphism, exception handling.
4. Implement Simple Web application using ASP.NET.
5. Implement Simple Database connectivity using ADO.NET.

Module – 2:   **14 Hours**
1. Perform console application for generating Fibonacci series, Prime number, Natural Numbers, etc.
2. Write a program to calculator using windows application.
3. Develop Online Banking and Transaction process using Event Handling and ADO.NET.
4. Create web application for shopping cart process using ASP.NET.
5. Implement Session Management process for email applications.
6. Perform String Manipulation with the String Builder and String Classes and C#.

REQUIREMENTS: Microsoft Visual Studio .Net framework.

TOTAL: 60 HOURS

FURTHER READING:
1. Develop real time applications using ASP.NET

COURSE OUTCOMES   Employability
At the end of this course, students will be able to,
CO1: Understand the basic concepts of C# Programming
CO2: Write C# program using classes, objects, and encapsulation
CO3: Understand the concepts of .NET framework
CO4: Design various applications using ADO.NET
CO5: Implement Web and Database Applications using .NET
CO6: Develop various real time applications using .NET concepts

REFERENCES:
1. Herbert Schidt, "The Complete Reference of C#",Tata McGraw Hill, 2017.
2. Kogent Learning Solutions C# Programming and .NET 4.5 Paperback, Dreamtech Press, 2013.
3. Beginning ASP.NET 4.5 in C# (APRESS) Paperback – 2014, by Matthew MacDonald, Dreamtech Press; Apress Special Priced edition.
4. Building Micro services with .NET Core 2.0: Transitioning monolithic architectures using micro services with .NET Core 2.0 using C# 7.0, Packt Publishing Limited, 2nd Revised edition, 2017.

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5. Paul C. Jorgensen, "Software Testing:- A Craftsman"s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.
6. http://nptel.ac.in/

17021T602	MOBILE COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE:
1. Computer Networks.

COURSE OBJECTIVES:
1. Understand the basic concepts of mobile computing.
2. Be familiar with the network protocol stack.
3. Learn the basics of mobile telecommunication system.
4. Be exposed to Ad-Hoc networks
5. Gain knowledge about different mobile platforms and application development

UNIT I   INTRODUCTION   9 Hours
Mobile Computing – Mobile Computing Vs Wireless Networking – Mobile Computing: Applications – Characteristics– Structure. MAC Protocols: Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT II   MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER   9 Hours
Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of Mobile Transport Layer, Traditional TCP Classical TCP improvements, TCP over 2.5/3G Wireless Networks, Performance Enhancing Proxies.

UNIT III   MOBILE TELECOMMUNICATION SYSTEM   9 Hours
Global System for Mobile Communication (GSM): Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT IV   MOBILE AD-HOC NETWORKS   9 Hours
Overview – Characteristics of MANET – spectrum of MANET applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Security in MANETs – Vehicular Ad Hoc networks (VANET) – MANET versus VANET.

UNIT V   OPERATING SYSTEM FOR MOBILE DEVICES   9 Hours
Commercial Mobile Operating Systems – Features of Windows CE, PalmOS, Symbian OS, and Java Card Support for Mobility: Pile systems, WWW, Wireless Application Protocol – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

TOTAL: 45 HOURS

FURTHER READING:
1. On site seminar at Telecommunication networks

COURSE OUTCOMES Employability
At the end of this course, students will be able to,
CO1: Explain the basics of mobile telecommunication system
CO2: Choose the required functionality at each layer for given application
CO3: Identify solution for each functionality at each layer
CO4: Explain various mobile ad hoc network protocols
CO5: Use simulator tools and design Ad hoc networks

REFERENCES:
1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2016.

2. Jochen H. Schller, "Mobile Communications", Second Edition, Pearson Education, New Delhi,   2014.

3. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2013.

4. Uwe Hansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2012.

5. William.C.Y.Lee,"Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition,Tata Mc Graw Hill Edition ,2012.

6. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2012.

7. http://nptel.ac.in/

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17021T603	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		3	0	2	4

PREREQUISITE:
Database Management Systems

COURSE OBJECTIVES:
1. Learn about the safe storage of data and architecture of data warehouse
2. Learn about the Elimination of errors from the data
3. Understand the Deleting data that is no longer important to the organization
4. Study the extraction of implicit, previously unknown, and potentially useful information from data
5. To help in the generation of reports for the management.

UNIT I   INTRODUCTION TO DATA WAREHOUSING 9 Hours
Introduction-Data warehouse Architecture– Online Analytical Processing (OLAP) Multidimensional data model– Data warehouse schema –OLAP Guidelines – Data Extraction, Clean up, and Transformation Tools – Metadata.

UNIT II   DATA MINING PRIMITIVES AND CONCEPT DESCRIPTION 9 Hours
Introduction to Data mining – Types of Data – Data Mining Functionalities – Interestingness of Patterns- Classification of Data Mining Systems – Data Mining Task Primitives-Pre-processing- Mining Frequent Patterns, Associations and Correlations – Mining Methods –Correlation Analysis – Constraint Based Association Mining.

UNIT III   CLASSIFICATION AND PREDICTION 9 Hours
Introduction – Decision Tree Induction – Bayesian Classification – Back propagation –Support Vector Machines- Lazy Learners – Other classification methods – Prediction.

UNIT IV   CLUSTERING AND ASSOCIATION 9 Hours
Cluster Analysis -Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods – Outlier Analysis -Density-Based Methods - Grid Based Methods – Model-Based Clustering Methods- Data Mining Applications.

UNIT V   ADVANCED TOPICS 9 Hours
Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Time Series and Sequence Mining – Graph Mining.

15 Hours

LIST OF EXPERIMENTS:
1. Exercise on Data warehouse design for an enterprise
   a. Loading the dataset.
   b. Data pre-processing.
2. Exercise on Discovering Association Rules
   c. A-priori algorithm.
   d. FP growth algorithm.
3. Exercise on Classification Algorithms
   e. Bayesian classification.
   f. Decision tree.
   g. Support vector machine
4. Exercise on Clustering Algorithms
   h. K-means clustering.
   i. One Hierarchical clustering.
5. Exercises on Data mining tools
   j. Applications of classification for web mining.
   k. Case Study on Text Mining or any commercial application.

SOFTWARE: WEKA, Rapid Miner, DB Miner, Python or Equivalent.

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TOTAL: 60 HOURS

FURTHER READING:
Data Science &Data Classifications

COURSE OUTCOMES:
At the end of this course, students will able to,
CO1: Explain the concepts of Data Warehousing architecture and implementation.
CO2: Apply the association rules for mining applications.   Employability
CO3: Discuss on appropriate Classification/ Clustering techniques for various problems with high dimensional data. Entrepreneurship
CO4: Apply data mining techniques and methods to large data sets.
CO5: Use various data mining tools to solve different data sets

CO6: Compare and contrast the various classifiers and clusters
CO7: Illustrate various data mining techniques on complex data objects and advanced concepts

REFERENCES:
1. Jiawei. Han, MichelineKamber, "Data Mining: Concepts and Techniques", Second Edition, Elsevier, New Delhi, 2017.
2. Vipin Kumar, Michael Steinbach," Introduction to Data Mining", Second Edition, Addison Wesley, 2015.
3. Dunham M, ―Data Mining: Introductory and Advanced Topics‖, Prentice Hall, New Delhi, 2013.
4. http://nptel.ac.in/

17021T604	WIRELESS COMMUNICATION	L	T	P	C
		3	0	0	3

PREREQUISITE:
1. Principles of Communications
2. Computer Networks.

COURSE OBJECTIVES:
1. Know the characteristic of wireless channel
2. Learn the various cellular architectures
3. Understand the concepts behind various digital signaling schemes for fading channels
4. Be familiar the various multipath mitigation techniques
5. Understand the various multiple antenna systems.

9 Hours

UNIT I   WIRELESS CHANNELS
Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading

9 Hours

UNIT II   CELLULAR ARCHITECTURE
Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking& grade of service – Coverage and capacity improvement – case study: Cellular Networks.

9 Hours

UNIT III   MULTIPLE ANTENNA TECHNIQUES
Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels – Case Study: OFDM principle – Cyclic prefix, Windowing, PAPR.

9 Hours

UNIT IV   MULTIPATH MITIGATION TECHNIQUES
Equalization – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception –Case Study: Rake receiver.

9 Hours

UNIT V   MIMO SYSTEMS AND TRANSMISSIONS
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming – transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

TOTAL: 45 HOURS

FURTHER READING:
1. Wireless Sensor Networks.
2. Drone Assisted Networks

COURSE OUTCOMES: Employability
At the end of the course, students will be able to,
CO1: Characterize wireless channels
CO2: Design and implement various signaling schemes for fading channels
CO3: Design a cellular system
CO4: Compare multipath mitigation techniques and analyze their performance
CO5: Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

REFERENCES:
1. Rappaport,T.S., "Wireless communications", Second Edition, Pearson Education, 2016.
2. Andreas.F. Molisch, "Wireless Communications", John Wiley – India, 2005.
3. David Tse and Pramod Viswanath, "Fundamentals of Wireless Communication", Cambridge University Press, 2012.
4. UpenaDalal, "Wireless Communication", Oxford University Press, 2014.
5. Van Nee, R. and Ramji Prasad, "OFDM for wireless multimedia communications", Artech House, 2010.

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1704IT651	MOBILE APPLICATION DEVELOPMENT (MINI PROJECT II)	L	T	P	C
		0	0	2	1

PREREQUISITE :
1. Java Programming.
2. Web Programming.

COURSE OBJECTIVES:
1. Introduce mobile application development tools
2. Design and develop useful mobile applications with compelling user interfaces
3. Create their own layouts and Views using Menus
4. Transfer apps to mobile.

a. Study of basics of mobile application development
   a. Introduction to Mobile Computing
   b. Introduction to
   c. Android Development Environment
b. Study of Factors in Developing Mobile Applications
   a. Mobile Software Engineering
   b. Frameworks and Tools
   c. Generic UI Development
   d. Android User

TO DEVELOP A MINI-PROJECT USING FOLLOWING PROBLEM STATEMENTS AND PROJECT SELECTION BASED ON REAL TIME AND SOCIAL ISSUES
1. Designing of UIs - VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the Right UI
2. Multichannel and Multimodial UIs
3. Study of Intents and Services - Android Intents and Services, Characteristics of Mobile Applications, Successful Mobile Development
4. Storing and Retrieving Data - Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider
5. Communications Via Network and the Web - State Machine, Correct Communications Model, Android Networking and Web
6. Telephony - Deciding Scope of an App, Wireless Connectivity and Mobile Apps, Android Telephony
7. Notifications and Alarms – Performance, Performance and Memory Management, Android Notifications and Alarms
8. Graphics - Performance and Multithreading, Graphics and UI Performance, Android Graphics
9. Multimedia - Mobile Agents and Peer-to-Peer Architecture, Android Multimedia
10. Location - Mobility and Location Based Services, Android
11. Putting It All Together - Packaging and Deploying, Performance Best Practices, Android Field Service App
12. Security and Hacking- Active Transactions, More on Security, Hacking Android
13. Platforms and Additional Issues - Development Process, Architecture, Design, Technology Selection, Mobile App Development Hurdles, Testing

TOTAL:45 HOURS

REQUIREMENTS:
Android Studio or Eclipse or Equivalent

ADDITIONAL EXPERIMENTS/ INNOVATIVE EXPERIMENTS:
1. Mobile App for Educational Institution
2. Mobile App for Industries

COURSE OUTCOMES
At the end of the course, students will be able to,
CO1: Understand the technology and business trends impacting mobile applications
CO2: Understand the characterization and architecture of mobile applications   *Skill Development*
CO3: Understand enterprise scale requirements of mobile applications
CO5: Design and develop mobile applications using one application development framework   *Employability*
CO6: Covert developed application to mobile

REFERENCES:
1. Jonathan McCallister, Mobile Apps Made Simple: The Ultimate Guide to Quickly Creating, Designing and Utilizing Mobile Apps for Your Business - 2nd Edition, March'2015
2. Dan Hermes, Xamarin Mobile Application Development: Cross-Platform C# and Xamarin.Forms

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Fundamentals, 2017
3. Ryan Cohen, Android Application Development for the Intel Platform, 2011
4. Valentino Lee, Mobile Applications: Architecture, Design, and Development: Architecture, Design, and Development, 2017

1704GE651	LIFE SKILLS: APTITUDE – II	L	T	P	C
		0	0	2	1

PREREQUISITE :
Life Skills: Aptitude - I

COURSE OBJECTIVES:
1. To brush up problem solving skill and to improve intellectual skill of the students
2. To be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors
3. To be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
4. To enhance analytical ability of students
5. To augment logical and critical thinking of Student

**UNIT I   PARTNERSHIP, MIXTURES AND ALLEGATIONS, PROBLEM ON   6 Hours
AGES, SIMPLE INTEREST, COMPOUND INTEREST**
Introduction Partnership - Relation between capitals, Period of investments and Shares- Problems on mixtures - Allegation rule - Problems on Allegation – Problems on ages - Definitions Simple Interest - Problems on interest and amount - Problems when rate of interest and time period are numerically equal - Definition and formula for amount in compound interest - Difference between simple interest and compound interest for 2 years on the same principle and time period.

UNIT II   BLOOD RELATIONS, CLOCKS, CALENDARS   6 Hours
Defining the various relations among the members of a family - Solving Blood Relation puzzles - Solving the problems on Blood Relations using symbols and notations - Finding the angle when the time is given - Finding the time when the angle is known - Relation between Angle, Minutes and Hours - Exceptional cases in clocks - Definition of a Leap Year - Finding the number of Odd days - Framing the year code for centuries - Finding the day of any random calendar date.

UNIT III   TIME AND DISTANCE, TIME AND WORK   6 Hours
Relation between speed, distance and time - Converting kmph into m/s and vice versa - Problems on average speed - Problems on relative speed - Problems on trains - Problems on boats and streams - Problems on circular tracks - Problems on races - Problems on Unitary method - Relation between Men, Days, Hours and Work - Problems on Man-Day-Hours method - Problems on alternate days - Problems on Pipes and Cisterns.

UNIT IV   DATA INTERPRETATION AND DATA SUFFICIENCY   6 Hours
Problems on tabular form - Problems on Line Graphs - Problems on Bar Graphs - Problems on Pie Charts - Different models in Data Sufficiency - Problems on data redundancy

UNIT V   ANALYTICAL AND CRITICAL REASONING   6 Hours
Problems on Linear arrangement - Problems on Circular arrangement - Problems on Double line-up - Problems on Selections - Problems on Comparisons - Finding the Implications for compound statements - Finding the Negations for compound statements- Problems on assumption - Problems on conclusions - Problems on inferences - Problems on strengthening and weakening of arguments.

Total: 30 Hours

COURSE OUTCOMES: *Employability / Skill Development*
At the end of the course, the student will be able to
CO1: Solve problems on Partnership, Mixture & Allegation and ages least time using shortcuts and apply real life situations.
CO2: Workout family relationships concepts, ability to visualize clocks & calendar and understand the logic behind a Sequence.
CO3: Calculate concepts of speed, time and distance, understand timely completion using time and work.
CO4: Learners should be able to understand various charts and interpreted data least time.
CO5: Workout puzzles, ability to arrange things in an orderly fashion
REFERENCES:

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1. Arun Sharma, „How to Prepare for Quantitative Aptitude for the CAT", 7th edition, McGraw Hills publication, 2016.
2. Arun Sharma, „How to Prepare for Logical Reasoning for CAT", 4th edition, McGraw Hills publication, 2017.
3. R S Agarwal, „A modern approach to Logical reasoning", revised edition, S.Chand publication, 2017.
4. R S Agarwal, „Quantitative Aptitude for Competitive Examinations" revised edition, S.Chand publication, 2017.
5. Rajesh Verma, "Fast Track Objective Arithmetic", 3rd edition, Arihant publication, 2018.
6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihnat publication, 2014.

17041T652	**INDUSTRIAL VISIT PRESENTATION**	**L**	**T**	**P**	**C**
		0	**0**	**2**	**1**

In order to provide the experiential learning to the students, shall take efforts to arrange at least two industrial visit / field visits in a year. A presentation based on Industrial visits shall be made in this semester and suitable credit may be awarded.

ASSESSMENT PATTERN :

Continuous Assessment (100 Marks)

Distribution of marks for Continuous Assessment	Marks
Test	40
Presentation / Quiz / Group Discussion	40
Report	20
Total	100

Grades (Excellent / Good / Satisfactory / Not Satisfactory)

Employability / Skill Development / Entrepreno

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1703MG002	PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3

AIM: The aim of this course is to address broad and general guideline that regulates decision making and behavior within a group or organization

COURSE OBJECTIVES:

1. To enable the students to study the evolution of Management
2. To relate, discuss, understand and present management principles, process and procedures.
3. To knowledge and understanding of the principles of management will enable the student manager or employee

UNIT I	INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS	9 Hours

Definition of Management – Science or Art – Manager Vs Entrepreneur - Types of managers - managerial roles and skills – Evolution of Management – Scientific, Human relations , System and contingency approaches.

UNIT II	PLANNING	9 Hours

Nature and purpose of planning – Planning Process – Types of planning – Objectives – Setting objectives – policies – Planning premises – Planning Tools and Techniques – Decision making steps and process.

UNIT III	ORGANISING	9 Hours

Nature and purpose – Formal and informal organization – Organization chart – Organization structure – Types – Line and staff authority – Departmentalization – Delegation of authority – Centralization and Decentralization – Job Design.

UNIT IV	DIRECTING	9 Hours

Foundations of Individual and Group behaviour – Motivation – Motivation theories – Motivational techniques – Job satisfaction – Job enrichment – Leadership – Types and theories of leadership – Communication – Process of communication – Barrier in communication – Effective communication –Communication and IT

UNIT V	CONTROLLING	9 Hours

System and process of controlling – Budgetary and non-budgetary control techniques – Use of computers and IT in Management control – Productivity problems and management – Control and performance – Direct and preventive control – Reporting

	TOTAL:	45 Hours

FURTHER READING: Decision roles of manager, Motivational thoughts.

COURSE OUTCOMES   Employability

At the end of this course, students will be able to,

CO1: Explain the elements of Management and Organization.
CO2: Summarize the types, policies, tools and techniques in Planning in Management
CO3: Relate the job design and human resource management in Organizing
CO4: Illustrate the skills of leadership and communication
CO5: Interpret the controlling techniques in Management

REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" 7 th Edition, Pearson Education, 2011.
2. Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill 1998.
3. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
4. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", 6 th Edition,Pearson Education, 2004.
5. Tripathy PC & Reddy PN, "Principles of Management", Tata McGraw Hill, 1999

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1703IT013	SOFTWARE ARCHITECTURES	L	T	P	C
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AIM: The main objective of this course to understand Concepts and methodologies for the systematic analysis, development, evolution, and reuse of software architectural design, styles, elements and connectors.

PREREQUISITE: Software Engineering

COURSE OBJECTIVES:
1. Understand architectural requirements
2. Identify architectural structure
3. Develop architectural documentation
4. Generate architectural alternatives
5. Evaluate the architecture against the drivers

		9 Hours
UNIT I	ARCHITECTURAL DRIVERS	

Introduction – Standard Definitions of Software Architecture– Architectural structures – Architecture Business Cycle – Quality Attribute Workshop (QAW) – Documenting Quality Attributes – Six part scenarios

		9 Hours
UNIT II	ARCHITECTURAL VIEWS AND DOCUMENTATION	

Introduction – Standard Definitions for views – Structures and views-- Representing views-available notations – Good practices in documentation– Documenting the Views using UML – Need for formal languages - Architectural Description Languages – ACME

		9 Hours
UNIT III	ARCHITECTURAL STYLES	

Introduction – Data flow styles – Call-return styles – Shared Information styles – Event styles – Case studies for each style

		9 Hours
UNIT IV	ARCHITECTURAL DESIGN	

Approaches for architectural design – System decomposition – Attributes driven design – Architecting for specific quality attributes – Performance, Availability – Security – Architectural conformance.

		9 Hours
UNIT V	ARCHITECTURE EVALUATION AND SOME SPECIAL TOPICS	

Page |

Need for evaluation – Scenario based evaluation against the drivers – ATAM and its variations – Case studies in architectural evaluations – SOA and Web services – Cloud Computing – Adaptive structures

	TOTAL:	**45 Hours**

FURTHER READING: Working with Open Source Platforms

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Explain key architectural drivers — *Skill Development*

CO2: Explain the influence of architecture on business and technical activities

CO3: Identify key architectural structures

CO4: Adopt good practices for documenting the architecture

CO5: Explain how to use formal languages to specify architecture — *Entrepreneurship*

CO6: Describe the recent trends in software architecture — *Employability*

REFERENCES:

1. Len Bass, Paul Clements, and Rick Kazman, "Software Architectures Principles and Practices", 2n Edition, Addison-Wesley, 2016.

2. Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications, 2013.

3. Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Read Little, Paulo Merson, Robert Nord, and Judith Stafford, "Documenting Software Architectures. Views and Beyond", 2nd Edition, Addison-Wesley, 2012.

4. David Garlan and Mary Shaw, "Software architecture: Perspectives on an emerging discipline", Prentice Hall, 2011.

5. Mark Hansen, "SOA Using Java Web Services", Prentice Hall, 2013.

6. David Garlan, Bradley Schmerl, and Shang-Wen Cheng, "Software Architecture-Based Self-Adaptation," 31-56. Mieso K Denko, Laurence Tianruo Yang, and Yan Zang (eds.), "Autonomic Computing and Networking". Springer Verlag, 2014.

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INFORMATION MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

To expose students with the basics of managing the information
To explore the various aspects of database design and modelling,
To examine the basic issues in information governance and information integration
To understand the overview of information architecture.

UNIT I   DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT   9
Database design and modelling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, MapReduce, Hive, and enhancements.

UNIT II   DATA SECURITY AND PRIVACY   9
Program Security, Malicious code and controls against threats; OS level protection; Security – Firewalls, Network Security Intrusion detection systems. Data Privacy principles. Data Privacy Laws and compliance.

UNIT III   INFORMATION GOVERNANCE   9
Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management.

UNIT IVINFORMATION ARCHITECTURE   9
Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems, Conceptual design, Granularity of Content.

UNIT V   INFORMATION LIFECYCLE MANAGEMENT   9
Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration;

TOTAL: 45 PERIODS

OUTCOMES: *Employability*
At the end of the course the students will be able to:
Cover core relational database topics including logical and physical design and modeling
Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities
Design, Create and maintain data warehouses.
Learn recent advances in NOSQL , Big Data and related tools.

TEXT BOOKS:

Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E, Tata McGraw Hill, 2011

Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2006

Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media; 1998

REFERENCES:

Jeffrey A. Hoffer, Heikki Topi, V Ramesh - MODERN DATABASE MANAGEMENT, 10 Edition, PEARSON, 2012

http://nosql-database.org/ Next Gen databases that are distributed, open source and scalable.
http://ibm.com/big-data - Four dimensions of big data and other ebooks on Big Data Analytics
Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011

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OBJECTIVES:
The student should be made to:
   Understand OSI security architecture and classical encryption techniques.
   Acquire fundamental knowledge on the concepts of finite fields and number theory.
   Understand various block cipher and stream cipher models.
   Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT I   INTRODUCTION & NUMBER THEORY   **10**
Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid"s algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat"s and Euler"s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II   BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY   **10**
Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT IIIHASH FUNCTIONS AND DIGITAL SIGNATURES   **8**
Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – El Gamal – Schnorr.

UNIT IVSECURITY PRACTICE & SYSTEM SECURITY   **8**
Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT VE-MAIL, IP & WEB SECURITY   **9**
E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IPSecurity:** Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). **Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

                                                                          TOTAL: 45 PERIODS

OUTCOMES: Employability)
Upon Completion of the course, the students should be able to:
   Compare various Cryptographic Techniques
   Design Secure applications
   Inject secure coding in the developed applications

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TEXT BOOKS:

William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).

Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).

REFERENCES:

Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.

Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.

Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.

Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.

Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.

Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.

Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.

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IT6702	DATA WAREHOUSING AND DATA MINING	L T P C
		3 0 0 3

OBJECTIVES:

The student should be made to:

Be familiar with the concepts of data warehouse and data mining,

Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

UNIT I   DATA WAREHOUSING   9

Data warehousing Components –Building a Data warehouse — Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II   BUSINESS ANALYSIS   9

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT III   DATA MINING   9

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

UNIT IV   ASSOCIATION RULE MINING AND CLASSIFICATION   9

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V   CLUSTERING AND TRENDS IN DATA MINING   9

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TOTAL: 45 PERIODS

OUTCOMES: ~~Employability~~

After completing this course, the student will be able to:

Apply data mining techniques and methods to large data sets.
Use data mining tools.
Compare and contrast the various classifiers.

TEXT BOOKS:

Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.

REFERENCES:

Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.
Daniel T.Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006.

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CS6703   GRID AND CLOUD COMPUTING   L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

Understand how Grid computing helps in solving large scale scientific problems.
Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
Learn how to program the grid and the cloud.
Understand the security issues in the grid and the cloud environment.

UNIT I   INTRODUCTION   9

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

UNIT II   GRID SERVICES   9

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

UNIT III   VIRTUALIZATION   9
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software -   Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV   PROGRAMMING MODEL   9
Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

UNIT V   SECURITY   9
Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TOTAL: 45 PERIODS

OUTCOMES: _Entrepreneurship_
At the end of the course, the student should be able to:
    Apply grid computing techniques to solve large scale scientific problems
    Apply the concept of virtualization
    Use the grid and cloud tool kits
    Apply the security models in the grid and the cloud environment

TEXT BOOK:
    Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

REFERENCES:
    Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009
    Tom White, "Hadoop The Definitive Guide", First Edition. O"Reilly, 2009.
    Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005
    Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2nd Edition, Morgan Kaufmann.
    Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press, 2009.
    Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005.
    Barry Wilkinson, "Grid Computing: Techniques and Applications", Chapman and Hall, CRC, Taylor and Francis Group, 2010.

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SOFTWARE TESTING   **L T P C**
3 0 0 3

OBJECTIVES:
The student should be made to:
>   Expose the criteria for test cases.
>   Learn the design of test cases.
>   Be familiar with test management and test automation techniques.
>   Be exposed to test metrics and measurements.

9

UNIT I   INTRODUCTION
Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester"s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies.

9

UNIT II   TEST CASE DESIGN
Test case Design Strategies – Using Black Bod Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.

9

UNIT III   LEVELS OF TESTING
The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

9

UNIT IV   TEST AMANAGEMENT
People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V TEST AUTOMATION 9 Software test automation – skill needed for automation – scope of automation – design and
architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

TOTAL: 45 PERIODS

OUTCOMES: *Employability*
At the end of the course the students will be able to
>   Design test cases suitable for a software development for different domains.
>   Identify suitable tests to be carried out.
>   Prepare test planning based on the document.
>   Document test plans and test cases designed.
>   Use of automatic testing tools.
>   Develop and validate a test plan.

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IT6711   DATA MINING LABORATORY   L T P C
                                                                           0   0 3 2

OBJECTIVES:
The student should be made to:
  Be familiar with the algorithms of data mining,
  Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.
  Be exposed to web mining and text mining

LIST OF EXPERIMENTS:
  Creation of a Data Warehouse.
  Apriori Algorithm.
  FP-Growth Algorithm.
  K-means clustering.
  One Hierarchical clustering algorithm.
  Bayesian Classification.
  Decision Tree.
  Support Vector Machines.
  Applications of classification for web mining.
  Case Study on Text Mining or any commercial application.

                                                                    TOTAL : 45 PERIODS

OUTCOMES:
After completing this course, the student will be able to:
  Apply data mining techniques and methods to large data sets.
  Use data mining tools. Skill Development
  Compare and contrast the various classifiers. Employability

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
WEKA, RapidMiner, DB Miner or Equivalent

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HARDWARE
Standalone desktops   30 Nos

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IT6712   SECURITY LABORATORY   L T P C
                                                                           0 0 3 2

OBJECTIVES:
The student should be made to:
  Be exposed to the different cipher techniques
  Learn to implement the algorithms DES, RSA,MD5,SHA-1
  Learn to use tools like GnuPG, KF sensor, Net Strumbler

LIST OF EXPERIMENTS
  Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
    Caesar Cipher
    Playfair Cipher
    Hill Cipher
    Vigenere Cipher
    Rail fence – row & Column Transformation

Implement the following algorithms
    DES
    RSA Algorithm
    Diffiee-Hellman
    MD5
    SHA-1

3 Implement the SIGNATURE SCHEME - Digital Signature Standard

Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).

Setup a honey pot and monitor the honeypot on network (KF Sensor)

Installation of rootkits and study about the variety of options

Perform wireless audit on an access point or a router and decrypt WEP and WPA.(Net Stumbler)

Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
    Implement the cipher techniques
    Develop the various security algorithms Skill Development
    Use different open source tools for network security and analysis Employability

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
C / C++ / Java or equivalent compiler

GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

HARDWARE:
Standalone desktops   -30 Nos.
         (or)
Server supporting 30 terminals or more.

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IT6713	GRID AND CLOUD COMPUTING LABORATORY	L T P C
		0 0 3 2

OBJECTIVES:
The student should be made to:
    Be exposed to tool kits for grid and cloud environment.
    Be familiar with developing web services/Applications in grid framework
    Learn to run virtual machines of different configuration.
    Learn to use Hadoop

LIST OF EXPERIMENTS:
GRID COMPUTING LAB:
Use Globus Toolkit or equivalent and do the following:
    Develop a new Web Service for Calculator.
    Develop new OGSA-compliant Web Service.
    Using Apache Axis develop a Grid Service.

Develop applications using Java or C/C++ Grid APIs
Develop secured applications using basic security mechanisms available in Globus Toolkit.
Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB:
Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
Install a C compiler in the virtual machine and execute a sample program.
Show the virtual machine migration based on the certain condition from one node to the other.
Find procedure to install storage controller and interact with it.
Find procedure to set up the one node Hadoop cluster.
Mount the one node Hadoop cluster using FUSE.
Write a program to use the API's of Hadoop to interact with it.
Write a word count program to demonstrate the use of Map and Reduce tasks.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
Use the grid and cloud tool kits. *Skill Development*
Design and implement applications on the Grid.
Design and Implement applications on the Cloud. *Employability*

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
Globus Toolkit or equivalent
Eucalyptus or Open Nebula or equivalent to

HARDWARE
Standalone desktops   30 Nos

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IT6801	SERVICE ORIENTED ARCHITECTURE	L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
Learn XML fundamentals.
Be exposed to build applications based on XML.
Understand the key principles behind SOA.
Be familiar with the web services technology elements for realizing SOA.
Learn the various web service standards.

9

UNIT I   **INTRODUCTION TO XML**
XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files.

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UNIT II   BUILDING XML- BASED APPLICATIONS   9
Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.

UNIT III   SERVICE ORIENTED ARCHITECTURE   9
Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV   WEB SERVICES   9
Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions.

UNIT VBUILDING SOA-BASED APPLICATIONS   9
Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines -- Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.

TOTAL: 45 PERIODS

OUTCOMES: *Employability*

Upon successful completion of this course, students will be able to:
- Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

TEXTBOOKS:
Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002
Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

REFERENCES:
Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002.
2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services An Architect's Guide", Prentice Hall, 20044.
James McGovern,Sameer Tyagi, Michael E.Stevens, Sunil Mathew, Java Web Services Architecture", Morgan Kaufmann Publishers, 2003

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IT6811	PROJECT WORK	L T P C
		0 0 12 6

OBJECTIVES:
To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 180 PERIODS

GE6075   PROFESSIONAL ETHICS IN ENGINEERING

OBJECTIVES:
To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I   HUMAN VALUES   10
Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II   ENGINEERING ETHICS   9
Senses of „Engineering Ethics" – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg"s theory – Gilligan"s theory – Consensus and Controversy – Models of professional roles- Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III   ENGINEERING AS SOCIAL EXPERIMENTATION   9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV   SAFETY, RESPONSIBILITIES AND RIGHTS   9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V GLOBAL ISSUES   8
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership- Code of Conduct – Corporate Social Responsibility

OUTCOMES :   Skill Development

                                                                     TOTAL: 45 PERIODS
Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

TEXTBOOKS:
Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:
Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009
John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
Edmund G Seebauer and Robert L Barry, "Fundametals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001
Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi 2013.\
World Community Service Centre, „ Value Education", Vethathiri publications, Erode, 2011

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CS6004   CYBER FORENSICS   L T P C
                                                                         3 0 0 3

OBJECTIVES:
The student should be made to:
> Learn the security issues network layer and transport layer.
> Be exposed to security issues of the application layer.
> Learn computer forensics.
> Be familiar with forensics tools.
> Learn to analyze and validate forensics data.

UNIT I   NETWORK LAYER SECURITY &TRANSPORT LAYER SECURITY   9
IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec.Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

UNIT II   E-MAIL SECURITY & FIREWALLS   9
PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

UNIT III   INTRODUCTION TO COMPUTER FORENSICS   9
Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

UNIT IV   EVIDENCE COLLECTION AND FORENSICS TOOLS   9
Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

UNIT V   ANALYSIS AND VALIDATION   9
Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics.

                                                            TOTAL: 45 PERIODS

OUTCOMES: Employability
Upon completion of the course, the student should be able to:
> Discuss the security issues network layer and transport layer.
> Apply security principles in the application layer.
> Explain computer forensics.
> Use forensics tools.
> Analyze and validate forensics data.

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TEXT BOOKS:

TEXT BOOKS:
> Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
> Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.

REFERENCES:
> John R.Vacca, "Computer Forensics", Cengage Learning, 2005
> Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
> Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

OBJECTIVES:

To outline the need for Software Project Management

To highlight different techniques for software cost estimation and activity planning.

UNIT I   PROJECT EVALUATION AND PROJECT PLANNING   9

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II   PROJECT LIFE CYCLE AND EFFORT ESTIMATION   9

Software process and Process Models – Choice of Process models - mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II A Parametric Productivity Model - Staffing Pattern.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT   9

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV   PROJECT MANAGEMENT AND CONTROL   9

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS   9

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TOTAL: 45 PERIODS

OUTCOMES: _Entrefrenewship_

At the end of the course the students will be able to practice Project Management principles while developing a software.

TEXTBOOK:

Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

Robert K. Wysocki "Effective Software Project Management" – Wiley Publication,2011.

Walker Royce: "Software Project Management"- Addison-Wesley, 1998.

Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.

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