DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
AR-18 REGULATIONS B.Tech. COURSE STRUCTURE

I YEAR I SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18MCT01**	Induction program	3 weeks			0	-	-
2	**P18HST01**	English-I	3	0	0	3	40	60
3	**P18BST01**	Mathematics - I	3	0	0	3	40	60
4	**P18BST03**	Applied Physics	3	0	0	3	40	60
5	**P18EST03**	C-Programming for Problem Solving	3	0	0	3	40	60
6	**P18EST02**	Engineering Graphics	1	0	3	2.5	40	60
7	**P18HSL01**	English Language & Communication Skills lab	0	0	3	1.5	40	60
8	**P18BSL01**	Applied Physics Lab	0	0	3	1.5	40	60
9	**P18ESL03**	C-Programming for Problem Solving Lab	0	0	3	1.5	40	60
10	**P18ESL02**	Engineering Workshop	0	0	3	1.5	40	60
Total Periods			**13**	**0**	**15**	**20.5**	**360**	**540**

I YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18HST02**	English-II	3	0	0	3	40	60
2	**P18BST02**	Mathematics – II	3	0	0	3	40	60
3	**P18BST05**	Applied Chemistry	3	0	0	3	40	60
4	**P18EST01**	Basic Electrical and Electronics Engineering	3	0	0	3	40	60
5	**P18EST05**	Python Programming	3	0	0	3	40	60
6	**P18BSL03**	Applied Chemistry Lab	0	0	3	1.5	40	60
7	**P18ESL01**	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	40	60
8	**P18ESL04**	Python Programming Lab	0	0	3	1.5	40	60
Total Periods			**15**	**0**	**9**	**19.5**	**320**	**480**

II YEAR I SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18CST01**	JAVA Programming	3	0	0	3	40	60
2	**P18CST02**	Data Structures	3	1	0	4	40	60
3	**P18ECT18**	Digital Logic Design	3	0	0	3	40	60
4	**P18BST07**	Mathematics - III	3	0	0	3	40	60
5	**P18CSL03**	Free Open Source Software	1	0	2	2	40	60
6	**P18CSL01**	JAVA Programming Lab	0	0	3	1.5	40	60
7	**P18CSL02**	Data Structures Lab	0	0	3	1.5	40	60
8	**P18ECL11**	Digital Logic Design Lab	0	0	3	1.5	40	60
9	**P18MCT02**	Environmental Sciences	3	0	0	0	100	-
10	**P18MCT04**	Soft Skills – I	2	0	0	0	100	-
Total Periods			**18**	**1**	**11**	**19.5**	**520**	**480**

II YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18CST03**	Mathematical Foundations of Computer Science	3	1	0	4	40	60
2	**P18CST04**	Computer Organization	3	0	0	3	40	60
3	**P18CST05**	Formal Languages & Automata Theory	3	0	0	3	40	60
4	**P18CST06**	Database Management Systems	3	1	0	4	40	60
5	**P18CST07**	Software Engineering	3	0	0	3	40	60
6		***Open Elective – I***	2	0	0	2	40	60
7	**P18CSL04**	Linux Programming	1	0	2	2	40	60
8	**P18CSL05**	Database Management Systems Lab	0	0	3	1.5	40	60
9	**P18MCT05**	Indian Constitution	2	0	0	0	100	-
10	**P18CSI01**	Internship	0	0	0	2	100	-
Total Periods			**20**	**2**	**5**	**24.5**	**520**	**480**

III YEAR I SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18CST08**	Computer Networks	3	0	0	3	40	60
2	**P18CST09**	Operating Systems	3	0	0	3	40	60
3	**P18CST10**	Artificial Intelligence & Machine Learning	3	1	0	4	40	60
4		**Professional Elective – I**	3	0	0	3	40	60
5		***Open Elective-II***	2	0	0	2	40	60
6	**P18MCT08**	Design thinking for Innovation	0	0	4	2	40	60
7	**P18CSL06**	Computer Networks & Operating Systems Lab	0	0	3	1.5	40	60
8	**P18CSL07**	Artificial Intelligence & Machine Learning Lab	0	0	3	1.5	40	60
9	**P18MCT10**	Soft Skills – II	2	0	0	0	100	-
Total Periods			**16**	**1**	**10**	**20**	**420**	**480**

Professional Elective – I		
S.No	**Course Code**	**COURSE**
i)	**P18CSE01**	Principles of Programming Languages
ii)	**P18CSE02**	Advanced Computer Architecture
iii)	**P18CSE03**	Computer Graphics
iv)	**P18CSE04**	Data Warehousing & Data Mining

III YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18CST11**	Hadoop& Big Data	3	0	0	3	40	60
2	**P18CST12**	Web Technologies	3	0	0	3	40	60
3	**P18CST13**	Design & Analysis of Algorithms	3	1	0	4	40	60
4		**Professional Elective-II**	3	0	0	3	40	60
5		***Open Elective –III***	2	0	0	2	40	60
6	**P18CSL08**	Hadoop& Big Data Lab	0	0	3	1.5	40	60
7	**P18CSL09**	Web Technologies Lab	0	0	3	1.5	40	60
8	**P18CSM01**	Mini Project-I / EPICS	0	0	4	2	40	60
9	**P18MCT12**	Soft Skills – III	2	0	0	0	100	-
Total Periods			**16**	**1**	**11**	**20**	**420**	**480**

Professional Elective – II		
S.No	**Course Code**	**COURSE**
i)	**P18CSE05**	Compiler Design
ii)	**P18CSE06**	Distributed Systems
iii)	**P18CSE07**	Middle Ware Technologies
iv)	**P18CSE08**	Cryptography & Network Security

IV YEAR I SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1	**P18CST14**	Web Development using MEAN Stack	3	1	0	4	40	60
2	**P18CST15**	OOAD with UML	3	0	0	3	40	60
3		**Professional Elective-III**	3	0	0	3	40	60
4		**Professional Elective-IV**	3	0	0	3	40	60
5		***Open Elective-IV***	2	0	0	2	40	60
6	**P18CSL10**	OOAD with UML Lab	0	0	3	1.5	40	60
7	**P18CSL12**	Mobile Application Development Lab	1	0	2	2	40	60
8	**P18CSL11**	MEAN Stack Lab	0	0	3	1.5	40	60
9	**P18MCT14**	Employability Skills	2	0	0	0	100	
Total Periods			**17**	**1**	**8**	**20**	**420**	**480**

Professional Elective – III		
S.No	**Course Code**	**COURSE**
i)	**P18CSE09**	Software Testing Methodologies
ii)	**P18CSE10**	Block Chain Technology
iii)	**P18CSE11**	Deep Learning
iv)	**P18CSE12**	Wireless Networks & Mobile Computing

Professional Elective – IV		
S.No	**Course Code**	**COURSE**
i)	**P18CSE13**	Multimedia Application Development
ii)	**P18CSE14**	Data Science
iii)	**P18CSE15**	Soft Computing
iv)	**P18CSE16**	Cloud Computing

IV YEAR II SEMESTER								
S.No	**CODE**	**COURSE**	**L**	**T**	**P**	**Credits**	**Internal**	**External**
1		**Professional Elective-V**	4	0	0	4	40	60
2		**Professional Elective-VI**	4	0	0	4	40	60
3	**P18MBT02**	Ethics &Human Values	2	0	0	2	40	60
4	**P18CSP01**	Project	0	0	12	6	80	120
Total Periods			**8**	**0**	**12**	**16**	**200**	**300**

Professional Elective – V		
S.No	**Course Code**	**COURSE**
i)	**P18CSE17**	Design Patterns
ii)	**P18CSE18**	Social Media Analytics
iii)	**P18CSE19**	Internet of Things
iv)	**P18CSE20**	GPU Programming
v)	**P18CSE21**	Service oriented Architecture

Professional Elective – VI		
S.No	**Course Code**	**COURSE**
i)	**P18CSE22**	Natural Language Processing
ii)	**P18CSE23**	Pattern Recognition
iii)	**P18CSE24**	Cyber Security
iv)	**P18CSE25**	Human Computer Interaction
v)	**P18CSE26**	Game Theory

B.Tech. I Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

English-I

(Common to all Branches)

Internal Marks: 40

Course Code: P18HST01 **External Marks: 60**

Course Prerequisite: The students should have basic knowledge of English grammar and LSRW skills.

Course Objectives:

1. To enable the engineering students to develop their basic communication skills in English for academic and social purposes.
2. To equip the students with appropriate oral and written communication skills.
3. To inculcate the skills of listening, reading and critical thinking.
4. To integrate English Language learning with employability skills and training.
5. To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course

Course Outcomes:

On completion of this course, the student is able to:

1. Use English Language effectively in spoken and written forms
2. Interpret the contextual meaning of words
3. Comprehend the given texts and respond appropriately
4. Recall and reproduce the theme in a given context
5. Communicate confidently in formal and informal contexts

UNIT – I (9 Lectures)

The Happy Prince – Oscar Wilde

a. Vocabulary: Synonyms and Antonyms
(http://www.magickeys.com/books/riddles/words.html)

b. Grammar: Prepositions, Sentence structure & Types of sentences

c. Writing: Note Making and Note Taking

UNIT – II (8 Lectures)

Technology with a Human Face – E.F.Schumacher

a. Vocabulary: One word substitutes & Idioms

b. Grammar: Subject–verb Agreement (Concord), Question tags and Modal Auxiliaries

c. Writing: Information Transfer

UNIT –III (9 Lectures)

Presidential Address – APJ Abdul Kalam

a. Vocabulary: Word formation, Root Words
(www.englishhints.com,www.enchantedlearning.com,
www.learnenglish.de/grammar/prefixtext.html)

b. Grammar: Parts of Speech, Punctuation

c. Writing: Paragraph Writing

UNIT- IV (9 Lectures)

The Road Not Taken – Robert Frost

a. Vocabulary: Prefixes, Suffixes and Affixes
(http://www.magickeys.com/books/riddles/words.html)

b. Grammar: Articles

c. Writing: Letter Writing

UNIT – V (10 Lectures)

Good Manners – J.C Hill

a. Vocabulary: Homonyms, Homophones and Homographs
(http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf)

b. Grammar: Tenses

c. Writing: E- mail Writing

Text books:

1. New Horizons – Pearson Publishers
2. Fluency in English", A Course Book for Engg. Students, Published by Orient Black Swan, Hyderabad, 2016 print.
3. "Technical Communication- Principles and Practice", Third Edition. New Delhi: Oxford University press.

Reference Books:

1. Meenakshi raman, Sangeetha, Sharma Fundamentals of technical communication, Pg:
   119-153 Oxford University press, 2015
2. Rutherford, Andhrea. J, Communication skills for technology. Pearson, New Delhi.2001
3. Raymond Murphy, Murphy's English Grammar, Cambridge University Press 2004
4. Meenakshi raman, Sangeetha, Sharma,Technical communication: English Skills for
   Engineers, Oxford University press, 2009
5. Michael Swan, Practical English Usage, Oxford University press, 1996

Web References:

1. www.englishhints.com
2. www.enchantedlearning.com
3. www.learnenglish.de/grammar/prefixtext.html
4. http://www.magickeys.com/books/riddles/words.html
5. http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf
6. http://www.yourdictionary.com
7. http://www.learnenglish.com
8. http://www.cambridge.org
9. http://www.eslcafe.com
10. http://www.eslgames.com
11. http://www.penguin.co.uk
12. http://www.edufind.com/english/practice

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B. Tech- I Year I Semester **Course structure**

L	T	P	C
3	0	0	3

MATHEMATICS-I
(Differential equations and Laplace Transforms)

(Common to All Branches)

Internal Marks: 40

Course code: P18BST01 **External marks: 60**

Course Prerequisite: The basic knowledge of Matrices, Trigonometry, Differentiation and Integration.

Course Objectives:

1. To learn the methods solving the differential equations of first order with their applications.
2. To learn the methods of solving differential equations of second and higher order with their applications .
3. To learn to find the Laplace transform of different functions and obtained the solution of Design.
4. To understand the concepts Partial Differential.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Solve first order differential equations and their applications.
2. Usage of higher order differential equations that are applied to real world problems.
3. Find the Laplace transform of derivatives, integrals and periodic functions.
4. Use the method of Laplace transforms to solve systems of linear first-order differential equations.
5. Calculate total derivative, Jacobian, Maxima and minima of functions of two variables.

UNIT-I: (11 Lectures)

Differential equations of first order and first degree:

Linear-Bernoulli-Exact-Reducible to exact.

Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.

UNIT-II: (9 Lectures)

Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax},sin ax, cos ax, polynomials in x, e^{ax}V(x), xV(x)- Method of Variation of parameters.

Applications: LCR circuit.

UNIT-III: Laplace Transforms: (10 Lectures)

Laplace transforms of standard functions– First shifting Theorem, Change of scale property, Multiplication by t^n, division by t, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions.

UNIT IV: Inverse Laplace Transforms: (8 Lectures)

Inverse Laplace transforms – Convolution theorem.

Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT V: Partial Differentiation: (10 Lectures)

Introduction- Homogeneous function-Euler's theorem-Total derivative-Chain rule-Generalized Mean value theorem for single variable (without proof)-Taylor's and Mc Laurent's series expansion of functions of two variables– Functional dependence-Jacobian.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

Web References:

1. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
2. http://mathworld.wolfram.com/topics
3. http://www.nptel.ac.in/course.php

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B.Tech I Year - I Semester

Course structure

L	T	P	C
3	0	0	3

C - Programming for Problem Solving

(Common to All Branches)

Course Code: P18EST03 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Nil

Course Objectives:

1. To impart adequate knowledge on the need of programming languages and problem solving techniques.
2. To impart problem solving skills.
3. To enable student to write programs in C and to solve the problems.

Course Outcomes:

At the end of this course the student will be able to

1. Design algorithms and flowchart / Pseudo code for a given problem.
2. Design programs involving decision structures and loops.
3. Implement different operations on arrays and solve problems using functions.
4. Understand pointers and strings.
5. Implement structures, unions and file operations in C programming for a given application problem.

Unit-I: (8 Lectures)

Introduction to Programming: Computer hardware, Bits and Bytes, programming languages, application and system software, the software development process.

Idea of algorithm: steps to solve logical and numerical problems. Representation of algorithm: flowchart/pseudo code with examples, from algorithms to programs.

Unit-II: (9 Lectures)

Introduction to C: Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing Input and Output. Decision Making - Branching and Looping. Enumerated Data type, Renaming Data type with typedef, Type Casting.

UNIT-III (10 Lectures)

Arrays: Definition, Declaration, Initialization, Assignment, Processing array, Passing array to a function, Two and multi dimensional array.

Functions: Defining a function, Accessing a function, Passing argument to functions, Function prototypes, Nested function call, Storage classes.

UNIT-IV (9 Lectures)

Pointers: Definition, initialization, operations on pointers, functions and pointers, arrays and pointers, pointers to pointers, dynamic memory allocation.

Strings: C Strings, String Input / Output functions, arrays of strings, string manipulation functions.

UNIT-V (9 Lectures)

Structures: Definition, declaration, initialization, accessing members, array of structures, arrays within structure, functions and structures, pointers to structures, nested structures, unions.

File Handling: Types, operations on files, modes, file I/O functions, Random Access Functions.

Text Books:

1. Byron S Gottfried, ―Programming with C, Schaums Outlines, Second Edition, Tata McGraw-Hill, 2006.
2. Problem Solving and Program Design in C, 4th edition, by jeri R. Hanly and Elli B.Koffman.
3. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. Yashavant P. Kanetkar. ―Let Us C, BPB Publications, 2011.

Web References:

1. https://www.studytonight.com/c/
2. https://www.cprogramming.com/tutorial/c-tutorial.html
3. https://www.javatpoint.com/c-programming-language-tutorial
4. https://www.tutorialspoint.com/cprogramming/

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B.Tech. I Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

APPLIED PHYSICS

(Common to ECE, CSE & IT)

Internal Marks: 40

Course code: P18BST03 **External Marks: 60**

Course Prerequisites

The basics of analytical and conceptual understanding of physics.

Course Objectives

1. To study the wave nature of light through Interference and diffraction.
2. To learn the basic principles of Lasers and fiber optics.
3. To express the physics of electrostatics and electromagnetic wave concepts through Maxwell's equations.
4. To study the basic concepts of Quantum mechanics.
5. Aware of limits of classical free electron theory and apply band theory of solids.
6. Acquire the knowledge of semiconductor physics.

Course Outcomes

1. Understanding the basic concepts of optics and how to apply them for engineering applications.
2. Acquire the knowledge of fundamentals of Lasers and fiber optics enables the students to develop Laser devices to apply them in various systems like communications, Industries and medicine.
3. Set students to be exposed to Electrostatics, Maxwell's equations, electromagnetic waves and fundamental concepts of quantum mechanics.
4. Enable to learn the fundamental concepts of free electron theory and band theory of solids.
5. Develop knowledge of band theory of solids for fundamentals of Semiconductor physics enables the students to apply the knowledge to various systems like communications, solar cell, photo cells and so on.

UNIT-I

Wave Optics (10 lectures)

Interference: Introduction, Superposition of waves, Interference of light by wave front splitting and amplitude splitting, interference in thin films, Newton's rings.

Diffraction: Introduction, differences between interference and diffraction, difference between Fraunhoffer and Fresnel diffraction, Fraunhoffer diffraction at single slit,

Diffraction grating (N-slits qualitative), diffraction at circular aperture, resolving power of microscope, and telescope.

UNIT-II

LASERS AND FIBER OPTICS (9 lectures)

Lasers: Introduction, Characteristics of laser, Absorption, spontaneous emission, stimulated emission, Einstein's coefficients, Pumping, Types of Lasers: Ruby laser, He-Ne laser.

Fiber optics: Introduction, Total internal reflection-wave propagation in optical fiber, Acceptance angle, numerical aperture.

UNIT-III (9 lectures)

Electrostatics, Maxwell's Equations And Electromagnetic Waves

Electrostatics: Coulombs law, electric field, electric field intensity, electric flux Density, electrostatic potential, divergence of electric field, Laplace's and Poisson's equations for electrostatic potential, Gauss theorem in electrostatics.

Maxwell's equations and electromagnetic waves: Gauss theorem in magneto statics, Faraday's law of electromagnetic induction, Ampere's law, displacement current, Maxwell's equations in vacuum, electromagnetic wave equation in dielectric medium, velocity of propagation of electromagnetic wave, poynting vector and poynting theorem.

UNIT-IV (12 lectures)

Quantum Mechanics, Free Electron Theory And Band Theory

Quantum Mechanics: Introduction to quantum physics, de-Broglie's hypothesis and properties of matter waves, Schrodinger's time independent wave equation, Particle in one dimensional box, physical significance of wave function.

Free electron theory: Free electron theory of metals assumptions and failures, Fermi Dirac distribution function- Fermi level, density of states.

Band theory of solids: Introduction, Bloch's theorem, Kronig penny model(qualitative), E-K diagram, Brillouin's zones, classification of solids into metals, semiconductors and insulators, effective mass of electron and concept of hole

UNIT-V (8 lectures)

Semiconductor Physics

Semiconductor physics: Introduction**,** Intrinsic and Extrinsic semiconductors. carrier concentration in intrinsic semiconductors, carrier concentration in N-type and P-type semiconductors, Dependence of Fermi energy on carrier-concentration and temperature, diffusion and drift, Hall effect and its applications, mechanism in LED, solar cell and photo conductor

Text Books:

1. A Textbook of Engineering Physics by Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.

2. Optics by Ajoy Ghatak, Tata McGraw-Hill Publishing company limited
3. Lasers and nonlinear optics by BB Laud, New age International Publishers
4. Introduction to Electrodynamics by David Griffiths, Cambridge University Press
5. Introduction to Quantum physics by Eisberg and Resnick.
6. Solid state physics by AJ Dekker.

Reference Books:

1. Applied physics by Palanisamy (Scitech publications)
2. Optics by Eugene Hecht, Pearson Education.
3. Principle of Lasers by O.Svelto
4. Electricity, magnetism and light by W. Saslow
5. Introduction to Quantum mechanics by D.J.Griffiths. Cambridge University Press
6. Quantum mechanics by Richard Robinett.
7. Quantum Chemistry by Daniel McQuarrie
8. Semiconductor Optoelectronics by J. Singh, Physics and Technology, Mc Graw-Hill inc
9. Engineering Physics by B.K. Pandey, S. Chaturvedi - Cengage Learing.
10. Physics by Halliday and Resnick

Web References:

1. http://jntuk-coeerd.in/
2. http://www.youtube.com
3. http://en.wikipedia.org
4. http://nptel.ac.in/syllabus/122106027/

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B.Tech I Year I Semester **Course Structure**

L	T	P	C
1	0	3	2.5

ENGINEERING GRAPHICS

(Common to EEE,ECE,CSE,IT Branches)

Internal Marks: 40

Course Code: P18EST02 **External Marks: 60**

Course Prerequisite: Nil

Course objectives:

1. To introduce the students to the "universal language of Engineers" for effective communication through drafting exercises.
2. To enable the students to acquire requisite knowledge, techniques and attitude required for advanced study of engineering drawing.
3. To enable the students to construct the layout development of basic solids for practical situations.
4. To enable the students to gain the ability to convert the Isometric views in to Orthographic views.
5. To enable the students to gain the ability to convert the Orthographic views in to Isometric views.

Course Outcomes:

After completion of the course the student will be able to

1. Gain the knowledge of various Geometrical Elements used in Engineering Practice.
2. Understand concepts of all 2 D elements like polygons, Conic Sections.
3. Understand concepts of 3 D Objects like various Prisms, Cylinders, Pyramids and Cones.
4. Draw and represent the Projections of various objects.
5. Convert the 3 D views in to 2 D views and vice versa.

UNIT-I: (12 Lectures)

Introduction To Engineering Graphics

Introduction to Drawing instruments and their uses, construction of regular polygons, Conic sections- ellipse, parabola, hyperbola using general method, Scales- Diagonal scale, Vernier scale.

UNIT-II: (12 Lectures)

Projections Of Points & Lines

Principle of orthographic projection-Method of Projection – First and third angle projection methods- Projections of Points –Projection of straight lines- parallel to one plane and inclined to the other plane.

UNIT-III: (16 Lectures)

Projections of Lines & Planes

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

Projections of Planes: Projections of plane figures: triangle, square, rectangle, pentagon and hexagon, circle with surfaces inclined to both the reference planes.

UNIT-IV: (12 Lectures)

Projections of Solids & Surface Development

Projections of Solids: Projections of regular solids with the axis inclined to only one reference plane.

Development of surfaces for basic solids- prisms, pyramids, cylinder and cone.

UNIT – V: (12 Lectures)

Projections Of Pictorial Views

Conversion of isometric views into orthographic views and conversion of orthographic views in to isometric views.

Text Book:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal, Charotar Publications, 2014.
2. Engineering Drawing by Basant Agrawal and C.M. Agrawal ,McGraw Hill Education Pvt. Limited, 2013.
3. Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah, Scitech Publications, 2010.

Reference Book:

1. Engineering Graphics with AutoCAD 2002 by James D. Bethune, PHI, 2011.
2. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd, 2010.
3. Engineering drawing – P.J. Shah .S.Chand Publishers, 2010.
4. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers, 2010.
5. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson, 2009.

Web References:

1. https://lecturenotes.in/subject/436/engineering-drawing-ed.
2. web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf.
3. https://www.smartzworld.com/notes/engineering-drawing-pdf-1st-year-notes-ppts
4. https://www.researchgate.net/305754529_A_Textbook_of_Engineering_Drawing
5. www.academia.edu/32510080/N_d_bhatt_engineering_drawing_pdf

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B.Tech. I Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

English Language Communication Skills Lab

(Common to EEE,ME,ECE,CSE,IT,AME Branches)

Internal Marks: 40

Course Code: P18HSL01 **External Marks: 60**

Course Prerequisite:

1. Basic knowledge of English grammar
2. Basic understanding of English vocabulary.
3. Ability to speak simple sentences.
4. Have interest to learn the language

Course Objectives

1. To facilitate computer assisted multimedia instructions enabling individualized and independent language learning.
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm.
3. To bring about a consistence accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence.
5. To train students to use language appropriately for public speaking, group discussion and interviews.

Course Outcomes

1. Better understanding of nuances of English language through audio visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances their employability skills.
4. Better understanding of the production of sounds of language.
5. Suitable body language for employability.

Scope:

The curriculum of the **ELCS Lab** is designed to focus on the production and practice of sounds of language and to familiarize the students with the use of English in everyday situations and contexts.

EXERCISE – I (3 Sessions)

- **A.** Ice – Breaking Activity, Greeting, Introducing and taking leave
- **B.** Introduction to Phonetics

  Vowel sounds – Pure Vowels & Diphthongs

  Consonant sounds

EXERCISE – II (2 Sessions)

- **A.** JAM Session, Situational Dialogues, Giving Directions & Narration
- **B.** Structure of Syllables - Plural markers & Past tense Markers

EXERCISE – III (2 Sessions)

- **A.** Role play, Giving Information and Asking Information
- **B.** Word Stress & Listening Comprehension – Listening for General Details

EXERCISE – IV (2 Sessions)

- **A.** Describing objects, events, places etc. & Presentation Skills – Extempore, Public Speaking.
- **B.** Consonant Cluster, Rules of 'r' pronunciation and Neutralization of Mother Tongue Influence

EXERCISE – V (3 Sessions)

- **A.** Interview Skills & Group Discussion
- **B.** Intonation & Listening Comprehension – Listening for Specific Details

Textbooks:

1. Strengthen your Communication Skills - Maruthi Publication, Hyderabad 2013
2. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

Reference Books:

1. INFOTECH English (Maruthi Publications).
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)
3. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
4. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
5. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
6. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
7. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad
8. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
9. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
10. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi : Foundation
11. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
12. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
13. English Pronouncing Dictionary Daniel Jones Current Edition with CD.

Web References:

1. http://www.cambridge.org
2. http://www.edufind.com/english/practice
3. http://www.learnenglish.com
4. http://www.penguin.co.uk

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B.Tech. I Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

C - Programming for Problem Solving Lab
(Common to All Branches)

Course Code: **P18ESL03**

Internal Marks: 40
External Marks: 60

Course Prerequisite: Nil

Course Objectives:

1. To understand the various steps in program development.
2. To understand the basic concepts in C Programming Language.
3. To understand different modules that includes conditional and looping expressions.
4. To understand how to write modular and readable C Programs.
5. To write programs in C to solve problems using arrays, structures and files.

Course Outcomes

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user-manuals.

EXPERIMENT WISE PROGRAMS

Experiment-1

a) Write a simple C program to Print “Hello World”
b) Write a simple C Program to Calculate Area and Circumference of Circle
c) Write a simple C program to implement basic arithmetic operations - sum, difference, product, quotient and remainder of given numbers.

Experiment-2

Write C programs to demonstrate the following operators

a) Assignment Operator.
b) Relational and Logical Operator.
c) Increment and decrement operator.

d) Bitwise operators.
e) Ternary operator.

Experiment-3

a) Write a C programs - to find the largest and smallest of 2 numbers(if – else), to find the largest and smallest of 3 numbers(Nested if – else), roots of quadratic equation(else – if ladder).
b) The total distance travelled by vehicle in't' seconds is given by distance=ut+1/2at2 where 'u' and 'a' are the initial velocity and acceleration. Write a c program to find the distance travelled at regular intervals of time given the Values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
c) Write a c program, which takes two integer operands and one operator from the user, performs the operation and the prints the result. (consider the operators +,-,*,/,% and use switch statement).

Experiment-4

a) Write a C program to find the sum of individual digits of a positive integer
b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1.Subsequent terms are found by adding the preceding two terms in the sequence .Write a c program to generate the first n terms of the sequence.
c) Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Experiment-5

a) Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$.
b) Write a C program to generate Pascal's triangle.
c) Write a C program to construct a pyramid of numbers

Experiment-6

a) Write a c program to find both the largest and smallest number in a list of integers.
b) Write a c program that uses functions to perform the following:
    i) Addition of Two Matrices.
    ii) Multiplication of Two Matrices.

Experiment-7

a) Write a programs that use both recursive and non-recursive functions
b) To find the factorial of a given integer.
c) To find the GCD of two given integers.

Experiment-8

a) Write a c program that uses functions to perform the following operations:
   i) To insert a sub-string in given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not.

Experiment-9

a) Write a C program that displays the position or index in the string S Where the string T begins, or - 1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text .

Experiment-10

a) Write a program to print the details of a student like(Name, Rollno, marks) using nested structures.
b) Write a C Program to Calculate Difference Between Two Time Period.

Experiment-11

a) Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)

Experiment-12

a) Write a C program which copies one file to another and display the contents of a file
b) Write a C program to reverse the first n characters in a file.
c) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

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B.Tech. I Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

APPLIED PHYSICS LAB

(Common to ECE, CSE & IT)

Internal Marks: 40

Course code: P18BSL01 **External Marks: 60**

Course Prerequisites:

The basics of analytical and conceptual understanding of physics.

Course Objective:

1. Deploy scientific method of experiments in the laboratory.
2. Develop the procedures and observational skills for appropriate use of simple and complex apparatus.
3. Enable analytical techniques, statistical analysis and graphical analysis.
4. Reinforce ideas and concepts covered in lecture host of experiments.
5. Train to find the radius of curvature of a Plano-convex lens forming Newton's rings.

Course Outcomes:

1. Apply the phenomenon of interference and diffraction of light waves.
2. Implement the concept of resonance in LCR circuit and Sonometer.
3. Analyze the SHM to determine its dependent properties.
4. Evaluate the behavior of electronic components and its characteristics.

List of Experiments

(Any eight of the following to be done)

1. Determination of Radius of Curvature of Plano - Convex lens by forming Newton's Rings.
2. Determination of Wavelengths of various spectral lines using diffraction grating with the normal incidence method.
3. Determination of wavelength of laser radiation.
4. Determination of Refractive index of a given prism..
5. Study of magnetic field along the axis of a current carrying coil and to verify Stewart-Gee's method.
6. Determination of energy gap of PN junction Diode.
7. Determination of hall coefficient and carrier concentration using Hall effect
8. Study of V-I characteristics of Zener diode.
9. Study of V-I characteristics of PN junction diode.
10. Determination of frequency of a vibrating bar or electrical tuning fork using Melde's apparatus.
11. Determination of acceleration due to gravity using compound pendulum

12. Verification of laws of transverse waves by Sonometer.
13. Determination of Velocity of sound by volume resonator.
14. Determination of rigidity modulus by Torsional Pendulum.

Text Books:

1. Madhusudhanrao, "Engineering Physics lab manual" Ist edition,Scietech Publication, 2015.
2. Ramarao Sri, Choudary Nityanand and Prasad Daruka, Lab Manual of Engineering physics 5th ed, Excell books, 2010.
3. Physics lab manual, department of physics, PACE Institute of Technology and Sciences.

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B. Tech- I Year I Semester

Course structure

L	T	P	C
0	0	3	1.5

ENGINEERING WORKSHOP

(Common to EEE,ECE,CSE,IT branches)

Internal Marks: 40

Course Code: P18ESL02 **External Marks: 60**

Course Pre-requisite: Nil

Course Objectives:

1. To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
2. To provide the students hands on experience to make different joints in carpentry with hand tools like jack plane, various chisels & hand saws.
3. To provide the students hands on experience to make different joints in Sheet metal work with hand tools like snips, stacks, nylon mallets etc.
4. To provide the students hands on experience to make different connections in house wiring with hand tools like cutting pliers ,tester ,lamps& lamp holders etc.
5. To develop a right attitude, team working, precision and safety at work place.

Course Outcomes:

At the end of the course the student will be able to

1. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
2. Familiarize with the basics of tools and equipment used in Carpentry.
3. Fabricate various basic components using Sheet metal.
4. Apply basic electrical engineering knowledge for house wiring practice.
5. Gain the hands on experience to form different models in Black smithy.

LIST OF EXPERIMENTS:

Minimum two experiments should be conducted from each trade

1. **Carpentry** **(6 Lectures)**
   a) Cross-Lap joint
   b) Dove tail joint
   c) T - Lap joint
   d) Mortise & Tenon joint
2. **Fitting** **(6 Lectures)**
   a) Square fit
   b) V - Fit

c) Half round fit
d) Dovetail fit

3. **Tin Smithy** **(6 Lectures)**
   a) Rectangular Tray
   b) Cylinder
   c) Square box without lid
   d) funnel
4. **Black Smithy** **(6 Lectures)**
   a) Round rod to Square
   b) S-Hook
   c) Round Rod to Flat Ring
   d) Round Rod to Square headed bolt
5. **House wiring** **(6 Lectures)**
   a) One lamp controlled by one switch
   b) Parallel and Series connections
   c) Fluorescent lamp fitting
   d) Stair case wiring

Reference Books:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers, 2015.
2. Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, Vikas publishers, 2009.
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House, 2003.

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B.Tech. I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

English-II

(Common to all Branches)

Internal Marks: 40

Course Code: P18HST02 **External Marks: 60**

Course Prerequisite: The students should have basic knowledge of English grammar and LSRW skills.

Course Objectives:

1. To enable the engineering students to develop their basic communication skills in English for academic and social purposes.
2. To equip the students with appropriate oral and written communication skills.
3. To inculcate the skills of listening, reading and critical thinking.
4. To integrate English Language learning with employability skills and training.
5. To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course

Course Outcomes:

On completion of this course, the student is able to:

1. Use English Language effectively in spoken and written forms
2. Interpret the contextual meaning of words
3. Comprehend the given texts and respond appropriately
4. Recall and reproduce the theme in a given context
5. Communicate confidently in formal and informal contexts

UNIT – I (8 Lectures)

My Struggle for an Education – Booker T. Washington

a. Vocabulary: Collocations

b. Grammar: Finite verbs, Non- finite verbs, Gerund, Transitive and Intransitive Verbs

c. Writing: Precis Writing

UNIT – II (9 Lectures)

In London – M.K.Gandhi

a. Vocabulary: Commonly confused words

b. Grammar: Active voice and Passive voice

c. Writing: Technical Report Writing

UNIT –III (10 Lectures)

Principles of Good Writing – L A Hill

a. Vocabulary: Commonly Misspelt Words

b. Grammar: Direct & Indirect Speech

c. Writing: Essay Writing

UNIT- IV (9 Lectures)

The Secret of Work – Swami Vivekanada

a. Vocabulary: Technical vocabulary

b. Grammar: Degrees of Comparison

c. Writing: Curriculum vitae, Cover Letter and Resume Writing. (Functional, Chronological and standard Resumes)

UNIT – V (9 Lectures)

Oh Father Dear Father – Raj Kinger

a. Vocabulary: Phrasal verbs

b. Grammar: Simple, Compound and Complex Sentences

c. Writing: Hints Development

Textbooks:

1. Board of Editors, "Sure Outcomes"– Orient Blackswan, Hyderabad, 2013
2. "Panorama" – Oxford University Press, New Delhi, 2016
3. "Fluency in English", A Course Book for Engg. Students, Published by Orient Black Swan, Hyderabad, 2016 print.
4. "Technical Communication- Principles and Practice", Third Edition. New Delhi: Oxford University press.

Reference Books:

1. Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004.
2. Rizvi Asheaf M, "Effective Technical Communication", Tata McGraw Hill, New Delhi, 2008.
3. Baradwaj Kumkum, Professional Communication", I.K. International-Principles and Practice". Third Edition. New Delhi: Oxford University Press.2015.
4. Trailblazers – Board of Editors – Orient Blackswan New Delhi.

Web References:

1. www.englishhints.com,www.enchantedlearning.com, www.learnenglish.de/grammar/prefixtext.html
2. http://www.magickeys.com/books/riddles/words.html
3. http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf
4. http://www.yourdictionary.com
5. http://www.learnenglish.com
6. http://www.cambridge.org
7. http://www.eslcafe.com
8. http://www.eslgames.com
9. http://www.penguin.co.uk
10. http://www.edufind.com/english/practice

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B. Tech- I Year II Semester **Course structure**

L	T	P	C
3	0	0	3

MATHEMATICS-II
(Linear algebra and Vector calculus)
(Common to All Branches)

Internal Marks: 40
Course code: P18BST02 **External marks: 60**

Course Prerequisite: Mathematics-I (P18BST01)

Course Objectives: To learn

1. The subject gives the knowledge about matrices and applications to solve linear equations.
2. The course intends to provide an overview of Eigen values and Eigen vectors which occur in Physical and engineering problems.
3. To integration over the regions.
4. The concepts of vector differentiation.
5. Line integral, Surface and volume integrals, Vector integral theorems.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Apply this knowledge to solve linear equations.
2. Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations.
3. Determine double integral over a region and triple integral over a volume.
4. Analyze the Vector differentiation in various domains.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT I: Linear systems of equations: (10 Lectures)
Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination – Gauss Jordon- Gauss Jacobi and Gauss Seidal methods.
Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms: (10 Lectures)
Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Diagonalization- Quadratic forms-Reduction of quadratic form to canonical form – Rank - Positive, negative and semi definite - Index – Signature.

UNIT III: Multiple integrals: (9 Lectures)
Double and triple integrals – Change of variables – Change of order of integration.
Applications: Finding Areas, surface areas and Volumes.

UNIT IV: Vector Differentiation: (10 Lectures)

Gradient-Directional derivative, Divergence- Solenoidal vector, Curl –Irrotational Vector, Vector identities.

Applications: Equation of continuity, potential surfaces.

UNIT V: Vector Integration: (9 Lectures)

Line integral – Work done – Potential function – Area- Surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

Applications: Work done, Force.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

Web References:

1. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
2. http://mathworld.wolfram.com/topics
3. http://www.nptel.ac.in/course.php

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B.Tech I Year - II Semester **Course structure**

L	T	P	C
3	0	0	3

PYTHON PROGRAMMING
(Common to All Branches)

Course Code: P18EST05 **Internal Marks: 40**
External Marks: 60

Course Prerequisite: **Nil**

Course Objectives:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and apply OOP concept.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To develop GUI applications in Python.

Course Outcomes:

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

1. Understand the basics of python programming.
2. Understand control flow and implement various data structures provided by python.
3. Implement packages, methods and functions.
4. Develop real-world applications using oops and exception handling.
5. Build GUI Applications in Python.

UNIT-I (9 Lectures)

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT-II (10 Lectures)

Types, Operators and Expressions: Types - Integers, Strings, Booleans, Expressions and order of evaluations, Control Flow- if, if-elif-else, for, while, break, continue, pass.

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.

UNIT III (11 Lectures)

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Modules: Creating modules, import statement, from. Import statement, name spacing,

Python packages: Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT IV (9 Lectures)

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding.

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

UNIT V (9 Lectures)

Brief Tour of the Standard Library & Files - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics, file operations.

Text Books

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/).
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books

1. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
2. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013.

Web References:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
2. https://www.codecademy.com/learn/learn-python
3. https://www.codementor.io/collections/learn-python-bwbc63ulz
4. http://www.diveintopython3.net/
5. https://www.python.org/3/
6. https://www.learnpython.org

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B.Tech I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

APPLIED CHEMISTRY
(for ECE,CSE,IT Branches)

Internal Marks: 40

Course Code: P18BST05 **External Marks: 60**

Course Prerequisite: Basic Chemistry at Intermediate or equivalent level.

Course Objectives

1. In this course. Student will learn the concepts and applications of chemistry in engineering.
2. It aims at strengthening the students with the fundamental concepts of chemistry. Plastics are nowadays used in household appliances; also they are used as composites (FRP) in aerospace industries.
3. It enables the students to know analysis of Advanced materials and used in diverse fields.
4. It makes the students to effectively use of electro chemistry, battery technology, and corrosion science in engineering applications
5. It enables the students to Spectroscopic techniques and applications.

Course Outcomes:

After completion of course student will be able to

1. The advantages and limitations of plastic materials and their use in design would be understood.
2. Analyze the different types of electrodes and batteries for technological applications.
3. To understand the 3D structure of the organic molecules.
4. Analyze the structure of the chemical compounds.
5. The students would aware of materials like nanomaterials, liquid crystals, green chemistry.

UNIT I: **(10 Lectures)**

High Polymers And Plastics

Polymerization: Introduction, classification, types of polymerization, Stereo regular polymers, Methods of polymerization (emulsion and suspension), Physical and mechanical properties.

Plastics as engineering materials: Advantages and limitations, Thermoplastics and Thermosetting plastics, Compounding and fabrication (4/5 techniques), Preparation, properties and applications of poly ethene, PVC, Bakelite and Teflon.

Elastomers: Natural rubber, compounding and vulcanization, Synthetic rubbers : Buna S, Buna N, Thiokol- preparation ,properties and applications, applications of elastomers. Composite materials & Fiber reinforced plastics, Conducting polymers.

UNIT II: **(10 Lectures)**

Electrochemistry And Corrosion

Introduction, Single electrode potential**,** EMF, Galvanic cell, Nernst equation and applications. Reference Electrodes-SHE, calomel electrode. Electro chemical series and uses of this series, Concentration cells

Batteries: Introduction, Types: Dry Cell, Ni-Cd Cells, Pb-acid storage cells, Li ion cells.

Corrosion: Causes Theories of Corrosion (chemical and Electro chemical), types-galvanic, differential aeration, stress corrosion, corrosion control methods– material selection and designing aspects, Cathode protection – sacrificial anodic protection and impressed current cathode. Galvanizing, Tinning, Electroplating of Copper and electro less plating of nickel.

UNIT III: (**10 Lectures)**

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.

UNIT-IV: **(10 Lectures)**

Spectroscopic Techniques And Organic Synthesis Of Drug Molecule

Principles of spectroscopy and selection rules. Electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Synthesis of commonly used drug molecules- Ibuprofen, Aspirin, Paracetamol.

UNIT -V: **(8 Lectures)**

Chemistry of Advanced Materials

Nano materials:- Introduction – Sol-gel method & chemical reduction method of preparation – Characterization by BET method and TEM methods - Carbon nanotubes and fullerenes: Types, preparation, properties and applications.

Liquid crystals: - Introduction, Types, Applications.

Super conductors: Introduction, Type-I & Type-II super conductors, properties and applications.

Green Chemistry: - Principles, 3or 4 methods of synthesis with examples and applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication & Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press.
3. Physical chemistry by K.Bahl and Tuli
4. Elementary organic spectroscopy by Y.R. Sharma, S.Chand publications
5. Spectroscopic techniques by H.Kaur. Pragati Prakashan publications

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others.
2. Engineering Chemistry by Prasanth Rath, Cengage Learning.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others.

Web References:

1. http://jntuk-coeerd.in/
2. http://en.wikipedia.org/wiki/title
3. http://nptel.ac.in/coures/105106/.com
4. https://en.wikipedia.org/wiki/Electrochemistry
5. https://www.youtube.com/watch?v=WLyaZbT97EI&list=PLzW3l18TEXrpqo3jRarGr9ao-61tB2184
6. http://encyclopedia.che.engin.umich.edu/Pages/Polymers/PolymerProduction/PolymerProduction.html
7. http://encyclopedia.che.engin.umich.edu/Pages/ProcessParameters/Spectrometers/Spectrometers.html

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B.Tech. I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to ECE,CSE,IT,EEE)

Internal Marks: 40

Course Code: P18EST01 **External Marks: 60**

Course Prerequisite: Physics.

Course Objective:

1. To study the concept of passive elements, and understand the applications of network theorems for analysis of electrical networks.
2. To Analyze the single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations.
3. To understand the faraday's laws and basic Principle of transformer.
4. To understand the working principle of various rotating machines.
5. To study the operation of PN junction diode, half wave, full wave rectifiers, Transistors and OP-AMPs.

Course Outcomes:

After completion of this course, the student is able to:

1. Solve various electrical networks in presence of active and passive elements and by using principles of network theorem.
2. Analyze the single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations.
3. Understand the faraday's laws and basic Principle of transformer.
4. Understand the working principle of various rotating machines.
5. Study the operation of PN junction diode, half wave, full wave rectifiers, Transistors and OP-AMPs

UNIT – I (10 Lectures)

Electrical Circuits

Basic definitions – Types of network elements- Types of sources - Ohm's Law - Kirchhoff's Laws –Inductive networks - Capacitive networks – Series - Parallel circuits- Star-delta and delta-star transformations - Source transformation - nodal analysis and mesh analysis - Super position theorem.

UNIT – II (9 Lectures)

AC Circuit Analysis

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT –III (9 Lectures)

Magnetic Circuits and Transformers

Basic definition of Magnetic quantities - Faraday's laws of electromagnetic induction- Analogy between electrical and magnetic circuits. Concept of self and mutual inductance. Principle of operation and construction of single phase transformer–EMF equation – Applications.

UNIT- IV (11 Lectures)

Rotating Machines

Construction and Principle of operation of DC Machines - EMF equation – Torque equation –Speed control of DC Shunt Motor- power losses and efficiency - Principle of operation and construction of 3-phase Induction motor - Principle of operation and construction of alternators.

UNIT – V (9 Lectures)

Introduction to Semiconductor Devices

PN junction diode - Diode applications -Half wave -Full wave rectifiers – Types of Transistors - PNP and NPN junction transistors, transistor as an amplifier- Frequency response of CE Amplifier- Characteristics of Operational Amplifiers.

Textbooks:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company,6 th Edition
2. Electrical Technology by Surinder Pal Bali, Pearson Publications.
3. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th Edition, PEI/PHI 2006.
4. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill

Reference Books:

1. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group
2. Electrical Machines by D. P.Kothari, I .J .Nagarth, Mc Graw Hill Publications, 4th Edition
3. Electrical Machines by R.K.Rajput, Lakshmi publications, 5th Edition.
4. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications
5. Electronic Devices and Circuits by David A. Bell, Oxford University Press
6. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA MC Graw Hill, Second Edition

Web References:

1. https://embeddedengineers.files.wordpress.com/2015/09/electronic-devices-and-circuits-by-salivahanan.pdf
2. https://electricalanswers.files.wordpress.com/2014/09/a-textbook-of-electrical-technology-volume-i-basic-electrical-engineering-b-l-theraja.pdf

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I Year - II Semester

Course Structure

L	T	P	C
0	0	3	1.5

PYTHON PROGRAMMING LAB

(Common to EEE,ME,ECE,CSE,IT,AME Branches)

Course Code: P18ESL04

Internal Marks: 40
External Marks: 60

Course Outcomes:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
2. Express different Decision Making statements and Functions.
3. Interpret Object oriented programming in Python.
4. Understand File handling operations.
5. Design GUI Applications.

Exercise1 - Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purpose fully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise 3 – Control Flow

a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2,1/3,1/4,...,1/10.
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a count down from that number to zero.

Exercise 4 – Control Flow-Continued

a) Find the sum of all the primes below two million. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

   1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure.

b) Write a program to use split and join methods in the string and trace a birth day with a dictionary data structure.

Exercise 6- DS-Continued

a) Write a program combine_lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise 7 - Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise 8 - Functions

a) Write a function dups to find all duplicates in the list.

b) Write a function unique to find all the unique elements of a list.

Exercise 9 - Functions –Problem Solving

a) Write a function cumulative_product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 10 – Multi - D Lists

a) Write a program to perform addition of two square matrices.

b) Write a program to perform multiplication of two square matrices.

Exercise 11 - OOP

Class variables and instance variable and illustration of the self variable

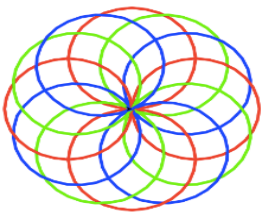
i)Robot.

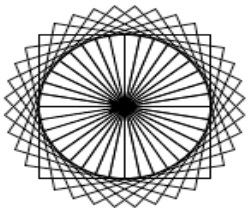
ii)ATM Machine.

Exercise - 12 GUI, Graphics

a) Write a GUI for an Expression Calculator using tk.

b) Write a program to implement the following figures using turtle





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B.Tech I Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

APPLIED/ENGINEERING CHEMISTRY LAB

(Common to ECE,CSE,IT)

Internal Marks: 40

Course Code: P18BSL03 **External Marks: 60**

Course Prerequisite: Basic Chemistry at Intermediate or equivalent level.

Course Objectives:

The purpose of this course to provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course Outcomes:

After completion of this course, the students should be able to

1. Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.
2. Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.

List Of Experiments:

Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.

Volumetric Analysis:

1. Estimation of Na_2CO_3 using standard HCl solution
2. Estimation of Mohr's salt using potassium dichromate ($K_2Cr_2O_7$) solution
3. Estimation of $CuSO_4$ using sodium thio sulphate ($Na_2S_2O_3$) solution.

Water Analysis:

4. Determination of hardness of water sample by EDTA method
5. Determination of alkalinity of water sample
6. Determination of free chlorine in bleaching powder

Instrumental Titrations:

7. Conduct metric Titrations between strong acid and strong base.
8. Conduct metric Titrations between strong acid and weak base.
9. Potentio metric Titration between Ferrous iron and potassium dichromate ($K_2Cr_2O_7$) solution

Food Analysis & Separation Of Compounds:

10. Estimation of Vitamin-c
11. Thin layer chromatography

Preparation Of Polymeric Resin:

12. Preparation of phenol formaldehyde resin
13. Preparation of urea formaldehyde resin

Lab Manual: Engineering/Applied Chemistry Lab Manual, Dept. of Chemistry, Pace Institute of Technology and Science, Vallur, Prakasam Dist., Andhra Pradesh, India.

Reference Books:

1. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II,
2. VGS Techno Series 3. Chemistry Practical Manual, Lorven Publications

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B.Tech. I Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

(Common to ECE,CSE,EEE.IT)

Internal Marks: 40

Course Code: P18ESL01 **External Marks: 60**

Course Prerequisite: None

Course Objective:

1. To verify and demonstrate on safety precautions and Kirchhoff's laws.
2. To demonstrate various protective devices, construction of transformer and rotating machines.
3. To verify superposition theorem and control of dc shunt motor using speed control methods.
4. To analyze the characteristics of CE amplifier, Half & Full wave rectifiers.
5. To analyze the characteristics of OP –Amp and CE amplifier

Course Outcomes:

After completion of this course, the student is able to:

1. Get an exposure on safety precautions and verify Kirchhoff 'slaws.
2. Get an exposure on construction of transformer and various protective devices.
3. Verify superposition theorem and control the speed of DC shunt motor using speed control methods.
4. Analyze the characteristics of CE amplifier, Half & Full wave rectifiers.
5. Analyze the characteristics of OP –Amp and CE amplifier

The following experiments are required to be conducted as compulsory experiments:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Verification of Kirchhoff's laws.
3. Demonstration of construction of Transformer and Rotating machines.
4. Demonstration on various protective devices.
5. Verification of superposition theorem
6. Speed control of D.C. Shunt motor by
    1. Armature Voltage control b) Field flux control method

7. PN junction diode characteristics
    a. Forward bias
    b. Reverse bias (Cut in voltage and resistance calculations)
8. Transistor CE characteristics (Input and output)
9. CE Amplifier Characteristics
10. Half Wave rectifier and Full Wave Rectifier without filters

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B.Tech II Year I Semester

Course Structure

L	T	P	C
3	0	0	3

MATHEMATICS-III

(Numerical methods and Fourier analysis)

(Common to All Branches)

Internal Marks : 40

Course Code: P18BST07 **External Marks: 60**

Course Prerequisite: Mathematics-I, Mathematics-II(P18BST01)

Course Objectives: To learn

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The Fourier series of a periodic function and its application to the solution of partial differential equations.
- To calculate the Fourier transform or inverse transform of common functions including Delta, Unit-Step.
- Learn to find Solution of One dimensional Wave, Heat equation

Course Outcomes: After learning the contents of this paper the student must be able to

- Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators.
- Solve ordinary differential equations numerically using Euler's and RK method.
- Analyze the spectral characteristics of signals using Fourier analysis. Classify systems based on their properties and determine the response
- Find Fourier series and Fourier transforms for certain functions.
- Identify/classify and solve the different types of partial differential equations.

UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation:

Introduction- Bisection method – Method of false position – Newton- Raphson method.

Interpolation: Introduction- Forward differences- Backward differences. Newton's formula for interpolation- Lagrange's interpolation formula.

UNIT II: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule- Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series- Euler's method –Modified Euler's method, Runge-Kutta method of fourth order.

UNIT III: Fourier Series:
Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series.

UNIT IV: Fourier Transforms:
Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier Transforms.

UNIT V: First order Partial differential equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard types)equations. Method of separation of Variables- Solution of One dimensional Wave, Heat equation.

Text Books:
1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

Web Resources:
1. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
2. http://mathworld.wolfram.com/topics
3. http://www.nptel.ac.in/course.php

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B.Tech II Year I Semester

Course Structure

L	T	P	C
3	0	0	3

JAVA PROGRAMMING

Internal Marks : 40

Course Code: P18CST01 **External Marks: 60**

Course Prerequisite: C Programming

Course Objectives:

1. To understand Object Oriented Programming concepts and basic characteristics of Java
2. To understand the principles of packages, inheritance and interfaces
3. To Implement exceptions and use I/O streams
4. To design and build simple Graphical User Interface application.

Course Outcomes:

1. Implement OOPS concepts in Java programs
2. Develop Java programs with the concepts of inheritance and interfaces
3. Design a Java applications using exceptions and I/O streams
4. Design interactive Java application using swings
5. Identify and Design Enterprise applications.

UNIT-I: (9 Lectures)

OOPS-Fundamentals: Object Oriented Programming concepts - Abstraction - objects and classes - Encapsulation- Inheritance -Polymorphism- OOP in Java - Characteristics of Java-Java Source File -Structure- Compilation- Data Types - Variables and Arrays - Operators - Control Statements- Classes – Objects - Methods.

UNIT-II: (9 Lectures)

OOPS-Inheritance: Inheritance - constructors- polymorphism-Access specifier-Static members-Packages -Abstract classes- Interfaces and Inner classes-object cloning - Array Lists - Strings.

UNIT-III: (9 Lectures)

Exception Handling: Exception handling -try-catch, throw, throws, finally block, user defined exception-built-in exceptions- Stack Trace Elements-Input -Output Basics - Streams - Byte streams and Character streams - Reading and Writing Console - Reading and Writing Files.

UNIT-IV: (9 Lectures)

Concurrent Programming: Multi-threaded programming - thread life cycle-interrupting threads - thread states - thread priorities- thread synchronization- Inter-

thread communication, daemon threads, thread groups-java Applets- Applet class, Applet structure, An Example Applet Program, Applet Life Cycle.

UNIT-V: (9 Lectures)

Graphics Programming: Graphics programming - Frame - Components- java.awt package, Container class, Layouts, Basics of event handling - event handlers -AWT event hierarchy - Swing Components- Text Fields, Text Areas - Buttons- Check Boxes – Radio Buttons - Lists- choices- Scrollbars - Windows -Menus - Dialog Boxes.

Text Books:

1. Java The complete reference, Herbert Schildt , 8th Edition, McGraw Hill Education, 2011.
2. Core Java Volume –I Fundamentals, Cay S. Horstmann, Gary cornell, 9th Edition, Prentice Hall, 2013.
3. Programming with JAVA, E.Balaguruswamy, 5th Edition, McGraw Hill Education, 2014.

References:

1. Java 2 Black book, Steven Holzner, Dreamtech press, 2011.
2. The JAVA programming language, K. Arnold and J. Gosling, Third edition, Pearson Education, 2000.
3. An introduction to Object-oriented programming with Java, C. Thomas Wu, Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.

Web References:

1. www.javaworld.com
2. www.ibm.com
3. www.java.sun.com

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B.Tech II Year I Semester

Course Structure

L	T	P	C
3	1	0	4

DATA STRUCTURES

Internal Marks: 40

Course Code: P18CST02 **External Marks: 60**

Course Prerequisite: C Programming

Course Objectives:

1. Comprehensive knowledge of data structures and ability to implement the same in software applications.
2. Exposure to algorithmic complexities, recursive algorithms, searching techniques.
3. Exposure to sorting technique, Applying stack techniques for logical operations.
4. Applying queue techniques for logical operations, Exposure to list representation models in various types of applications.
5. Implementation of tree in various forms, Advanced understanding of other variants of trees and their operations.
6. Orientation on graphs, representation of graphs, graph traversals, spanning trees Graphs.

Course Outcomes:

1. Ability to select the data structures that efficiently model the information in a problem.
2. Apply sorting/searching technique to solve given problem.
3. Analyze basic data structures such as Stacks, Queues and Linked List.
4. Design programs using Linear and Non-Linear data structures.
5. Analyze variety of Graph data structures that are used in various applications

UNIT-I: (12 Lectures)

Data Structure, Recursion & **Searching:** Preliminaries of algorithm, Algorithm analysis and complexity. **Data Structure:** Definition, types of data structures.

Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Types of recursion (Linear, binary and Tail), recursive algorithms for factorial function, GCD Computation, Fibonacci sequence.

Searching: List Searches using Linear Search, Binary Search, Fibonacci Search

UNIT-II: (12 Lectures)

Sorting Techniques: Basic Concepts, Sorting by: Insertion (Insertion Sort), Selection (heap sort), Exchange(Bubble sort, Quick Sort), distribution(Radix sort) and merging(Merge sort) Algorithms.

Stacks: Basic Stack operations, Representation of a stack using arrays, Stack Applications: Reversing list, Infix to postfix transformation.

UNIT-III: (13 Lectures)

Queues: Introduction, Representation of a Queue using arrays, Queue Operations, Applications of queues- Round Robin Algorithm, Circular Queues, Priority Queues.

Linked List: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications: single linked list to represent polynomial expressions, Circular linked list, Double linked list.

UNIT-IV: (12 Lectures)

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays, operations on a Binary tree, Binary Tree Traversals (recursive).

Advanced Tree Concepts: Binary search tree, Basic concepts, BST operations: Searching, insertion, deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees Definition and Examples only.

UNIT-V: (11 Lectures)

Graphs: Basic concepts, Graph Representations- Adjacency matrix, Adjacency lists, Graph algorithms: Graph Traversals (BFS & DFS), applications: Dijkstra's shortest path, Minimum Spanning Tree using Prim's & Kruskal's Algorithm.

Text Books:

1. Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage,2007.
2. Data Structures and Algorithms, G.A.V.Pai, TMH, 2008
3. Data Structures and Algorithms Made Easy, Narasimha Karumanchi , Second Edition, 2011.

Reference Books:

1. Data Structure with C, Seymour Lipschutz, TMH,2010.
2. Classic Data Structures, 2/e, Debasis ,Samanta,PHI,2009
3. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press.

Web References:

1. www.geeksforgeeks.org
2. www.hackr.io.
3. www.letsfindcourse.com

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B.Tech II Year I Semester

Course Structure			
L	**T**	**P**	**C**
3	**0**	**0**	**3**

DIGITAL LOGIC DESIGN

Internal Marks : 40

Course Code: P18ECT18 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. Able to perform the conversion among different number systems.
2. Familiar with basic logic gates -- AND, OR & NOT, XOR, XNOR; independently or work in team to build simple logic circuits using basic.
3. Understand Boolean algebra and basic properties of Boolean algebra; able to simplify simple Boolean functions by using the basic Boolean properties.
4. Able to design simple combinational logics using basic gates. Able to optimize simple logic using Karnaugh maps, understand "don't care".
5. Familiar with basic sequential logic components: SR Latch, D Flip-Flop and their usage and able to analyze sequential logic circuits.

Course Outcomes:

1. Students will be aware of various number systems and conversion of number systems.
2. Students will be aware of theory of Boolean Algebra & the underlying features of various logic gates.
3. Students will be aware of designing mapping method upto 6-variables.
4. Students will be able to use the concepts of Boolean Algebra for the analysis & design of various combination logic circuits.
5. Students will be able to use the concepts of Boolean Algebra for the analysis & design of various sequential logic circuits.

UNIT- I: (9 Lectures)

Number Systems and Binary Codes: Number System, Types of Number Systems, Number base Conversions from one radix to another radix, Representation of Signed Binary Numbers, 2's complement arithmetic, 1's complement arithmetic. Gray code, Excess-3 code, BCD code. Binary Arithmetic.

UNIT -II: (9 Lectures)

Boolean algebra: Logic gates, Laws of Boolean algebra, Principle of Duality, Principle of Complements, Reducing Boolean Expressions, Boolean Functions, Canonical and Standard Forms, M-Notations: Minterms and Maxterms,

UNIT- III: (10 Lectures)

Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, Implementation using NAND and NOR.

UNIT- IV: (9 Lectures)

Combinational Logic Design: Introduction, Design Procedure, Adders, Subtractors, Binary Adder–Subtractor, Decoders, Encoders, Multiplexers.

UNIT- V: (8 Lectures)

Sequential Logic Design: Introduction, Storage Elements: one bit memory cell, Latches, Flip Flops, Clocked Flip Flops, Shift Registers, Asynchronous counters, Synchronous counters.

Text Books:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA, 2011.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage, 2010.
3. A.K.Singh,Digital Logic Circuits, New Age International Publishers,

Reference Books:

1. Switching Theory and Logic Design, A.Anand Kumar, 2016.
2. Digital Electronics and Logic Design, Dr. Sanjay Sharma, 2010.
3. Modern Digital Electronics, R.P. Jain, TMH, 2010.

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B. Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	0

ENVIRONMENTAL SCIENCE

(Common to all Branches)

Course Code: P18MCT02 **Internal Marks: 100**

Course Prerequisite: Basic knowledge about sciences up to intermediate or equivalent level.

Course Objectives:

1. Overall understanding of the natural resources
2. Basic understanding of the ecosystem and its diversity
3. Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
4. An understanding of the environmental impact of developmental activities
5. Awareness on the social issues, environmental legislation and global treaties

Course Outcomes:

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

1. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web
2. The natural resources and their importance for the sustenance of the life and recognize the need to conserve the nat.ural resources
3. Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
4. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
5. Social issues both rural and urban environment and the possible means to combat the challenges and environmental assessment stages involved in EIA and the environmental audit.

UNIT I **(9 Lectures)**

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Definition, Scope and Importance– Need for Public Awareness. Renewable energy Resources, Solar energy-solar cells, solar batteries, wind energy, wind mills, ocean energy, tidal energy and nonrenewable energy resources: LPG, water gas, producer gas. World food problems, degradation and Soil erosion - overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity.

UNIT II **(8 Lectures)**

ECOSYSTEMS: Concept of an ecosystem. – Structure, Components and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Ecological pyramids - Food chains, food webs and Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem. b. Grassland ecosystem c. Desert ecosystem d. Aquatic – River and Lake Ecosystems.

UNIT III **(8 Lectures)**

BIODIVERSITY AND ITS CONSERVATION: Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India –Value of biodiversity: consumptive use, Productive use, social, ethical and aesthetic values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV **(9 Lectures)**

ENVIRONMENTAL POLLUTION: Definition, Cause, Effects and Control measures of : a. Air Pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution, f. Nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – **Disaster management:** floods, earthquake, cyclone and landslides.

UNIT V **(8 Lectures)**

SOCIAL ISSUES AND THE ENVIRONMENT: From unsustainable to sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management –Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies Population growth – Impacts on society, variation among nations. Environmental Impact Assessment (EIA) and Environmental Protection Acts.

Text Book:

1. Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press, 2005.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi, 2008.

Reference Books:

1. Environmental Science & Engineering by Dr. A. Ravikrishnan, Hitech Publishing Company Pvt. Ltd. 2013.

2. Perspectives in Environmental Studies, Second edition, AnubhaKoushik and C.P. Koushik, New Age International (P) Limited, Publishers, 2004.

Web References:

1. Environmental Science - Oxford Research Encyclopedia
2. Environmental Science - Museum of Science and Industry
3. Collegesat.du.ac.in/UG/Envinromental%20Studies_ebook.pdf

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B.Tech II Year I Semester

Course Structure

L	T	P	C
2	0	0	0

SOFT SKILLS-I (HUMAN VALUES)

Course Code: P18MCT04 **Internal Marks: 100**

Course Outcomes:

1. Understand and analyse the essentials of value education and basic human aspiration.
2. Evaluate Sanyam and Svasthya.
3. Identify and evaluate the role of trust,& respect in family, society and universal human order.
4. Understand holistic perception of harmony in existence at all levels
5. Apply ethic and value in project works, internships and personal life

Course content and overview:

Course Overview: This course 'Human Values' introduces self-exploration, self-confidence, commitment to learning, improvement in human relationships, imbibing universal human values and ethical human conduct. Students learn to apply their knowledge to lead a happy and prosperous life and also to include an ethical conduct to their profession. This course provides an intensive practice of self-exploration and enables the student to have a complete understanding of their own and of the world around them. This course aims to enable a human being to live a fulfilling life, in harmony with oneself, with family, society and nature and helps them to identify values based on right understanding. This course also enables the student to form a vision for humanistic education, constitution and human conduct to lead a universal human order.

Scope and Objective of the course :This course is poised to showcase the distinct advantages of possessing self-discovery, identification of their aspirations and understanding universal human values to fulfill their aspirations in continuity and identify true human happiness, human welfare, what is of 'value' to 'oneself.'

SYLLABUS:

Competency **1: Introduction to Value Education:** Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity - The Basic Human Aspirations, Right Understanding, Relationship and Physical Facilities, Happiness and Prosperity – Current Scenario, Method to fulfill the Basic Human Aspirations.

Competency **2: Harmony in the Human Being:** Understanding the Human Being as Co-existence of Self ('I') and Body, Discriminating between the Needs of the Self and

the Body, The Body as an Instrument of 'I', Understand Harmony in the Self ('I'), Harmony of the Self ('I') with the Body, Program to Ensure Sanyam and Svasthya.

Competency **3: Harmony in the Family and Society:** Harmony in the Family - the Basic Unit of Human Interaction, Values in Human-to-Human Relationships, 'Trust' – the Foundational Value in Relationships, 'Respect' – as the Right Evaluation, Understand Harmony in the Society, Vision for the Universal Human Order.

Competency **4: Harmony in the Nature (Existence)**: Understand Harmony in the Nature, Interconnectedness, Self-regulation and Mutual Fulfillment among the Four Orders of Nature, Realizing 'Existence is Co-existence' at All Levels, The Holistic Perception of Harmony in Existence.

Competency **5: Implications of the Right Understanding** – a Look at Professional Ethics: Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models - Typical Case Studies, Strategies for Transition towards Value-based Life and Profession.

Competencies:

At the end of the course the student should be able to:

C 1 understands the Need, Content and the Process of Value Education.
C 2 starting to observe inside and learns Purpose, Content and process of self-exploration.
C 3 knows and develops about the Right understanding of one- self.
C 4 learn and apply about Aspirations, living with Wrong Assumptions and Need for Right understanding.
C 5 understands Harmony in the Self and lead the equilibrium with in the self.
C 6 understands Harmony with the body and maintains the co-ordination with the body
C 7 learns to maintain cordial relations by understanding Harmony in Family and Society.
C 8 develop holistic perception by understand Harmony in Nature (Existence)
C 9 applying holistic perception in Professional Ethics.
C 10 competencies in Professional Ethics

Text Book:

1. A Foundation Course in Human Values and Professional Ethics - R R Gaur, R Sangal and G P Bagaria, First Edition, Excel Books.

Reference Books:

1. Ivan Illich, Energy & Equity , The Trinity Press, Worcester and Harper Collins, USA.
2. E F Schumacher, 1973, small is beautiful: A study of Economics as if People Mattered, Blond & Briggs, Britain
3. Sussan George, 1976, How the Other Half Dies, Penguin press, reprinted 1986, 1991.
4. Donella H. Measows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972,Limits to GrowthClub of Rome's report, Universe Books.
5. P.L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publisher
6. A.N. Tripathy,2003, Human Values, New Age International Publishers
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
9. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
10. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books
11. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.

B.Tech II Year I Semester

Course Structure

L	T	P	C
1	0	2	2

FREE OPEN SOURCE SOFTWARE

Internal Marks: 40

Course Code: P18CSL03 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

To teach students various unix utilities and shell scripting

Course Outcomes:

2. Implement various applications using build systems.
3. Understand the installation of various packages in open source operating systems.
4. Create simple applications using shell.
5. Understand various version control systems.
6. Understand the kernel configuration and virtual environment.

List of Experiments:

1. **Session-1**
   1. Log into the system
   2. Use vi editor to create a file called myfile.txt which contains some text.
   3. Correct typing errors during creation.
   4. Save the file
   5. logout of the system

   Session-2
   1. Log into the system
   2. open the file created in session 1
   3. Add some text
   4. Change some text
   5. Delete some text
   6. Save the Changes
   7. Logout of the system
2. a) Log into the system
   b) Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields

1425	Ravi	15.65
4320	Ramu	26.27
6830	Sita	36.15
1450	Raju	21.86

c) Use the cat command to display the file, mytable.

d) Use the vi command to correct any errors in the file, mytable.

e) Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)

f) Print the file mytable

g) Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)

h) Print the new file, mytable

i) Logout of the system

j) Login to the system

k) Use the appropriate command to determine your login shell

l) Use the /etc/passwd file to verify the result of step b.

m) Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.

n) Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

3. Write a sed command that deletes the first character in each line in a file.

a) Write a sed command that deletes the character before the last character in each line in a file.

b) Write a sed command that swaps the first and second words in each line in a file.

4. Pipe your /etc/passwd file to awk, and print out the home directory of each user.

a) Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.

b) Repeat

c) Part using awk

5. a) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

b) Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

6. Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.

7. a) Write a shell script that computes the gross salary of a employee according to the following rules

   i) If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.

   ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic The basic salary is entered interactively through the key board.

8. Write a shell script to search given number using binary search.
9. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

   b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.

   c) Write a shell script to perform the following string operations:

   i) To extract a sub-string from a given string.

   ii) To find the length of a given string.

10. Write a shell script which will display Armstrong numbers from given arguments
11. Write a shell script to display factorial value from given argument list
12. Write a C program that simulates ls Command
    (Use system calls / directory API)

Do the following Shell programs also

1. Write a shell script to check whether a particular user has logged in or not. If he has logged in, also check whether he has eligibility to receive a message or not
2. Write a shell script which will display the username and terminal name who login recently in to the unix system
3. Write a shell script to find no. of files in a directory
4. Write a shell script to check whether a given number is perfect or not
5. Write a menu driven shell script to copy, edit, rename and delete a file
6. Write a shell script for concatenation of two strings
7. Write a shell script which will display Fibonacci series up to a given number of argument
8. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat

   Rules: avg>=80 then grade A

   Avg<80&&Avg>=70 then grade B

   Avg<70&&Avg>=60 then grade C

   Avg<60&&Avg>=50 then grade D

   Avg<50&&Avg>=40 then grade E

   Else grade F

9. Write a shell script to accept empno,empname,basic. Find DA,HRA,TA,PF using following rules. Display empno, empname, basic, DA,HRA,PF,TA,GROSS SAL and NETSAL. Also store all details in a file called emp.dat

   Rules: HRA is 18% of basic if basic > 5000 otherwise 550

   DA is 35% of basic

PF is 13% of basic
IT is 14% of basic
TA is 10% of basic

10. Write a shell script to demonstrate break and continue statements
11. Write a shell script to display string palindrome from given arguments
12. Write a shell script to display reverse numbers from given argument list
13. Write a shell script which will find maximum file size in the given argument list
14. Write a shell script which will greet you “Good Morning”, ”Good Afternoon”, “Good Evening” and “Good Night” according to current time
15. Write a shell script to sort the elements in a array using bubble sort technique
16. Write a shell script to find largest element in a array
17. Write an awk program to print sum, avg of students marks list
18. Write an awk program to display students pass/fail report
19. Write an awk program to count the no. of vowels in a given file
20. Write an awk program which will find maximum word and its length in the given input File
21. Write a shell script to generate the mathematical tables.
22. Write a shell script to sort elements of given array by using selection sort.
23. Write a shell script to find number of vowels, consonants, numbers, white spaces and special characters in a given string.
24. Write a shell script to search given number using binary search.

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B. Tech II Year I Semester

Course Structure			
L	**T**	**P**	**C**
0	**0**	**3**	**1.5**

JAVA PROGRAMMING LAB

Internal Marks : 40

Course Code: P18CSL01 **External Marks: 60**

Course Prerequisites: C Programming and Object-Oriented Concepts.

Course Objectives:

1. To build software development skills using java programming for real-world applications.
2. To understand and apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
3. To develop applications using JDBC programming and event handling.

Course Outcomes:

1. Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
2. Develop and implement Java programs with arraylist, exception handling and multithreading .
3. Design applications using file processing, JDBC programming and event handling.

Exercise - 1 (Basics)

1. Write a JAVA program to display default value of all primitive data type of JAVA.
2. Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.
3. Write a program to check whether a number is Armstrong or not

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

1. Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
2. Write a JAVA program to sort for an element in a given list of elements using bubble sort.
3. Write a Java program to demonstrate String handling methods.

Exercise - 3 (Class, Objects, Constructor)

1. Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.
2. Write a JAVA program implement method overloading.
3. Write a JAVA program to implement constructor and constructor overloading.

Exercise - 4 (Inheritance, Method Overriding)

1. Write a JAVA program to implement Single Inheritance
2. Write a JAVA program to implement multi level Inheritance
3. Write a java program for abstract class to find areas of different shapes
4. Write a JAVA program that implements Runtime polymorphism(Method Overriding) problem

Exercise - 5 (Array List & Exception)

1. Write a program to perform string operations using ArrayList. Write functions for the following
   a. Append
   b. Insert
   c. Search
   d. List all string starts with given letter.
2. Write a JAVA program that describes exception handling mechanism
3. Write a JAVA program Illustrating Multiple catch clauses

Exercise – 6 (User defined Exception)

1. Write a JAVA program for creation of Illustrating throw.
2. Write a JAVA program for creation of Illustrating finally.
3. Write a JAVA program for creation of Java Built-in Exceptions.
4. Write a JAVA program for creation of User Defined Exception.

Exercise – 7 (Threads)

1. Write a JAVA program that creates threads by extending Thread class .First thread display “Good Morning “every 1 sec, the second thread displays “Hello “every 2 seconds and the third display “Welcome” every 3 seconds ,(Repeat the same by implementing Runnable).
2. Write a program illustrating **isAlive** and **join ().**

Exercise - 8 (File Handling)

Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

Exercise – 9 (JDBC & Packages)

1. Write a java program that connects to a database using JDBC of the following
    a. add
    b. Delete
    c. Modify
    d. Retrieve operations.
2. Write a java program to create a package called employee and implement this package out of the package.

Exercise - 10 (Applet)

1. Write a JAVA program to paint like paint brush in applet.
2. Write a JAVA program to display analog clock using Applet.
3. Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 11 (Event Handling)

1. Write a JAVA program that display the x and y position of the cursor movement using Mouse.
2. Write a JAVA program that identifies key-up key-down event user entering text in a
   Applet.

Exercise - 12 (Swings)

1. Write a JAVA program to build a Calculator in Swings.
2. Write a JAVA program to display the digital watch in swing tutorial.

Exercise – 13 (Swings - Continued)

1. Write a JAVA program that to create a single ball bouncing inside a JPanel.
2. Write a JAVA program JTree as displaying a real tree upside down

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B.Tech II Year I Semester

Course Structure			
L	**T**	**P**	**C**
0	**0**	**3**	**1.5**

DATA STRUCTURES LAB

Internal Marks : 40

Course Code: P18CSL02 **External Marks: 60**

Course Prerequisites: C- Programming

Course Objectives:

1. To choose the appropriate data structure and algorithm design method for a specified application.
2. To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

1. Analyze and implement various searching and sorting techniques.
2. Make use of data structures such as stacks, Queues and linked list to develop their applications.
3. Examine different tree traversal techniques.
4. Experiment with different graph traversal techniques.

Exercise 1:

Write recursive program for the following

a) Write recursive C program for calculation of Factorial of an integer

b) Write recursive C program for calculation of GCD (n, m)

c) Write recursive program which computes the n^{th} Fibonacci number

Exercise 2:

a) Write recursive C program for functions to perform Linear search for a Key value in a given list.

b) Write recursive C program for functions to perform Binary search for a Key value in a given list.

c) Write recursive C program for functions to perform Fibonacci search for a Key value in a given list.

Exercise 3:

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order.

b) Write C program that implement Quick sort, to sort a given list of integers in ascending order

c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order

Exercise 4:

a) Write C program that implement heap sort, to sort a given list of integers in ascending order
b) Write C program that implement radix sort, to sort a given list of integers in ascending order
c) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise 5:

a) Write C program that implement stack (its operations) using arrays
b) Write C program that implement stack (its operations) using Linked list

Exercise 6:

a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
b) Write C program that implement Queue (its operations) using arrays.
c) Write C program that implement Queue (its operations) using linked lists

Exercise 7:

a) Write a C program that uses functions to create a singly linked list
b) Write a C program that uses functions to perform insertion operation on a singly linked list
c) Write a C program that uses functions to perform deletion operation on a singly linked list.

Exercise 8:

a) Write a C program to Create a Binary Tree of integers
b) Write a recursive C program for Traversing a binary tree in preorder, inorder and postorder.

Exercise 9:

Write a C program for BST operations (insertion, deletion)

Exercise 10:

a) Write a C program for finding minimum spanning tree in a graph by using Prim's algorithm.
b) Write a C program for finding minimum spanning tree in a graph by using Kruskal's algorithm.

B.Tech II Year I Semester

Course Structure			
L	**T**	**P**	**C**
0	**0**	**3**	**1.5**

DIGITAL LOGIC DESIGN LAB

Internal Marks : 40

Course Code: P18ECL11 **External Marks: 60**

Course Objectives:

1. Understand concept of various components
2. Understand concepts that underpin the disciplines of Analog and digital electronic logic circuits
3. Describe Various Number system and Boolean algebra
4. Design and implementation of combinational circuits
5. Design and implementation of sequential circuits
6. Describe Hardware description language

Course Outcomes:

1. Achieve Knowledge and Awareness of various components to design stable analog circuits.
2. Represent numbers and perform arithmetic operations.
3. Minimize the Boolean expression using Boolean algebra and design it using logic gates
4. Analyse and design combinational circuit.
5. Design and develop sequential circuits
6. Translate real world problems into digital logic formulations using VHDL.Laboratory Objectives and outcomes for Digital Design

List of Experiments:

1. Verification of Logic gates.
2. Implementation all individual gates with Universal gates NAND & NOR.
3. Design a circuit for the given canonical form, draw the circuit diagram & Verify the De-Morgan laws.
4. Construct Half adder & full adder using half adder and verify truth table.
5. Design and study the Half Subtractor and verify the truth table.
6. Design a combinational logic circuit for 4x1 MUX and verify the truth table.
7. Design a combinational logic circuit for 1x4 DE-MUX and verify the truth table.
8. Design and implementation of BCD to excess-3 code converter and vice versa using logic gates.

9. Design and implementation of binary to gray code converter and vice versa using logic gates.
10. Verification of the truth table of basic flip-flops with synchronous & asynchronous modes.

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B.Tech II Year II Semester

Course Structure

L	T	P	C
3	1	0	4

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Internal Marks : 40

Course Code: P18CST03 **External Marks: 60**

Prerequisites: Basic Mathematics.

Course Objectives:

1. To explain with examples the basic terminology of functions, relations, and sets.
2. To perform the operations associated with sets, functions, and relations.
3. To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
4. To describe the importance and limitations of predicate logic.
5. To relate the ideas of mathematical induction to recursion and recursively defined structures.
6. To use Graph Theory for solving problems.

Course Outcomes:

1. Ability to illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
2. Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
3. Ability to represent and Apply Graph theory in solving computer science problems.

UNIT I: (12 Lectures)

Mathematical Logic : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. **Predicates**: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT II: (13 Lectures)

Relations: Basic Structures, Sets, Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties,

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UNIT III: (12 Lectures)

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application. Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT IV: (11 Lectures)

Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance **Advanced Counting Techniques:** Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion- Exclusion, Applications of Inclusion-Exclusion.

UNIT V: (12 Lectures)

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Text Books:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7th Edition, TMH, 2012.
2. Introduction to Discrete Mathematics,M.K.Sen, B.C Chakraborty, 2012
3. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill, 2008.
4. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel,T.P. Baker, PHI, 2008.

References Books:

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblay and R. Manohar, TMH, 1988.
2. Discrete Mathematics- Richard Johnsonbaugh, 7Th Edn., Pearson Education, 2009.
3. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M. Parmenter, 2nd edition,2002.
4. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education, 2016.

Web References:

1. www.digitaldefynd.com
2. www.mathily.org

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B.Tech II Year II Semester

Course Structure

L	T	P	C
3	0	0	3

COMPUTER ORGANIZATION

Internal Marks : 40

Course Code: P18CST04 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. Understand the architecture of a modern computer with its various processing units and Performance measurement of the computer system.
2. To understand various data transfer techniques in digital computer.
3. To understand the memory management system of computer.

Course Outcomes:

1. Ability to understand basic structure of computer.
2. To perform computer arithmetic operations.
3. To understand control unit operations.
4. Analyze the memory hierarchy in a computer system.
5. Ability to understand the concept of cache mapping techniques and I/O organization.

UNIT I: (9 Lectures)

Basic Structure of Computers: Organization and Architecture, Structure and Function, Computer Components, Computer Function, Bus Interconnection, Processor Organization, Register Organization.

Basic Computer Organization and Design: Instruction codes, Computer instructions, Memory reference instructions, Instruction Cycle.

Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC.

UNIT II: (10 Lectures)

Register Transfer and Micro Operations: Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

Micro Programmed Control: Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control..

UNIT III: (9 Lectures)

Computer Arithmetic: Data representation- Fixed point representation, Floating point representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Representations, Floating-point Arithmetic Operations, Decimal Arithmetic Units, Decimal Arithmetic Operations.

UNIT IV: (8 Lectures)

Memory Organization: Memory system overview, Memory Hierarchy, Semi-conductor Main Memory, Cache Memory principle, Elements of cache design, Virtual Memory, Magnetic Disk, Optical Memory, Magnetic Tape, RAID.

Input- Output: External Devices, I/O modules, Interrupts, Programmed I/O, Interrupt-driven I/O, Direct Memory Access, I/O Channels and Processors, PCI**.** Asynchronous Data Transfer, Priority Interrupt, Serial Communication**.**

UNIT V: (9 Lectures)

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multi Processors: Multiprocessors and Multi computers, Characteristics of Multi-processors, Multiple Processor Organizations, Symmetric Multi-Processors, Cache Coherence, Clusters, Non Uniform Memory Access (NUMA).

Text Books:

1. Computer Systems Architecture, M. Moris Mano, 3rd Edition, Pearson Education, 2007.
2. Computer Organization and Architecture, William Stallings, 8th Edition, Pearson Education, 2010.
3. Computer Architecture and Organization, John P. Hayes, 3rd Edition, McGraw Hill,2012.

References:

1. Computer Systems Organization and Architecture, John D. Carpinelli, 3rd Edition, Pearson Education, 2001.
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZak , 5th Edition, TMH, 2011.

Web References:

1. www.hackr.io
2. www.nptel.ac.in
3. www.coursera.org

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B.Tech II Year II Semester

Course Structure

L	T	P	C
3	0	0	3

FORMAL LANGUAGES & AUTOMATA THEORY

Internal Marks : 40

Course Code: P18CST05 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. Introduce the student to the concepts of Theory of computation in computer science
2. The students should acquire insights into the relationship among formal languages, formal Grammars and automat.

Course Outcomes:

1. Classify machines by their power to recognize languages,
2. Employ finite state machines to solve problems in computing,
3. Explain deterministic and non-deterministic machines,
4. Comprehend the hierarchy of problems arising in the computer science.

UNIT I: (10 Lectures)

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

UNIT II: (9 Lectures)

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT III: (10 Lectures)

Context Free Grammars &Pushdown Automata: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar,

Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, EProductions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.
Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic
and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata.

UNIT IV: (8 Lectures)

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.

UNIT V: (8 Lectures)

Computability: Decidable and Un-decidable Problems, Halting Problem of Turing Machines, Post's Correspondence Problem, Modified Post's Correspondence Problem, Classes of P and NP, NP Hard and NP-Complete Problems.

Text Books:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekharan, 3rd Edition, PHI, 2007.
3. Formal Languages and Automata Theory, Basavaraj S.Anami, Karibasappa K.G.,Wiley India,2011.

Reference Books:

1. Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu
   Kandar, Pearson, 2013.
3. Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

Web References:

1. www.cs.cornell.edu
2. www.automatatutor.com

B.Tech. II Year II Semester

Course Structure

L	T	P	C
3	1	0	4

DATABASE MANAGEMENT SYSTEMS

Internal Marks : 40

Course Code: P18CST06 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. Provides students with theoretical knowledge
2. Practical skills in the design, use of databases and database management systems in information technology applications.

Course Outcomes:

1. Acquire knowledge in fundamentals of DBMS and identify the differences between traditional file system and DB systems.
2. Understand various DBMS models and how queries are being processed and executed in RDBMS.
3. Analyze DB design methodology and normalization process.
4. Discuss the various transaction and concurrency management techniques
5. Discuss various files indexing techniques.

UNIT I: (11 Lectures)

INTRODUCTION: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure

UNIT II: (13 Lectures)

ENTITY RELATIONSHIP MODEL: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

RELATIONAL MODEL: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints and their importance.

BASIC SQL : Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub

queries, grouping, aggregation, ordering, implementation of different types of joins, views.

UNIT III: (12 Lectures)

SCHEMA REFINEMENT (NORMALIZATION): Problems Caused by Redundancy, Decompositions, Problems Related to Decomposition, Functional dependency, Properties of Functional dependency, Properties of Decompositions - Lossless join decomposition and dependency preserving decomposition, Normal forms based on functional dependency - 1NF, 2NF and 3NF, concept of surrogate key, Boyce-Codd normal form(BCNF).

UNIT IV: (13 Lectures)

TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint. Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT V: (11 Lectures)

OVERVIEW OF STORAGES AND INDEXING: Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing.

Text Books:

1. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH,2002.
2. Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA,2010.
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning,2012.
4. Database Management Systems,Rajesh Narang,Second Edition,2018.

References:

1. Database System Concepts. 5/e Silberschatz, Korth, TMH,2002.
2. Introduction to Database Systems, 8/e C J Date, PEA,2000.
3. The Database book principles & practice using Oracle/MySql Narain Gehani, University Press,2008.

Web References:

1. www.academy.vertabelo.com
2. www.w3schools.com
3. www.codecademy.com

B.Tech II Year II Semester

Course Structure

L	T	P	C
3	0	0	3

SOFTWARE ENGINEERING

Internal Marks : 40

Course Code: P18CST07 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. To understand the software life cycle models.
2. To understand the software requirements and SRS document.
3. To understand the importance of modeling and modeling languages.
4. To design and develop correct and robust software products.
5. To understand the quality control and how to ensure good quality software.
6. To understand the planning and estimation of software projects.
7. To understand the implementation issues, validation and verification procedures.
8. To understand the maintenance of software

Course Outcomes:

1. Compare and contrast basic software engineering methods and practices.
2. Analyze the software process models.
3. Analyze the project management essentials.
4. Outline the importance of software testing and quality control approaches.

UNIT I: (9 Lectures)

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software
Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT II: (9 Lectures)

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT III: (9 Lectures)

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT IV: (9 Lectures)

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing

UNIT V: (9 Lectures)

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Software Maintenance: Software maintenance, Maintenance Process Models, Maintenance Cost, Software Configuration Management.

Text Books:

1. Software engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

Reference Books:

1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

Web References:

1. https://www.tutorialspoint.com/software_engineering
2. https://nptel.ac.in/courses/106101061/1
3. http://ceit.aut.ac.ir/~91131079/SE2/SE2%20Website/Lecture%20Slides.html

B.Tech II Year II Semester

Course Structure

L	T	P	C
3	0	0	3

INDIAN CONSTITUTION

Course Code: P18MCT05 **Internal Marks: 100**

Course Prerequisite: NIL

Course Objectives:

1. To know about Indian constitution.
2. To know about central government functionalities in India.
3. To know about state government functionalities in India.
4. To know about functions of Indian Constitution
5. To know about Indian society

Course Outcomes:

1. Understand the background and structure of Indian Constitution
2. Understand the functions of the Indian government
3. Understand the functions of the State government
4. Understand and abide the rules of the Indian constitution.
5. Understand and appreciate different culture among the people.

UNIT I : INTRODUCTION [6 hours]

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II : STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT [6 hours]

Union Government – Structures of the Union Government and Functions – President– Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III : STRUCTURE AND FUNCTION OF STATE GOVERNMENT [6 hours]

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV : CONSTITUTION FUNCTIONS [6 hours]

Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries – Assessment of working of the Parliamentary System in India.

UNIT V : INDIAN SOCIETY [6 hours]

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TEXTBOOKS:

1. Durga Das Basu, "Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.
3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

REFERENCES:

1. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.

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1. https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf
2. https://www.india.gov.in/my-government/constitution-india
3. www.legislative.gov.in/constitution-of-india
4. https://www.constitution.org/cons/india/const.html

B.Tech II Year II Semester

Course Structure

L	T	P	C
1	0	2	2

LINUX PROGRAMMING

Internal Marks : 40

Course Code: P18CSL04 **External Marks: 60**

Course Prerequisite: NIL

Course Objectives:

1. To give a practical orientation of programming in Linux environment using system calls and advanced concepts in Unix programming.

Course Outcomes:

1. Students will be able to understand the basic commands of linux operating system and can write shell scripts.
2. Students will be able to create file systems and directories and operate them.
3. Students will be able to create processes background and fore ground etc..by fork() system calls.
4. Students will be create shared memory segments, pipes, message queues and can exercise interprocess communication.

Programs List:

1. Write C programs that uses open, read, write system calls.
2. Write C programs that differentiates FILE *(file stream pointers in C standard library) and file descriptors by using functions such as fdopen, fileno.
3. Write a C program which lists all the files of current working directory whose size is more than given number of data blocks.
4. Write a C program which lists all the files of current working directory which contains hard link files.
5. Example C program which supports that child process inherits environment variables, command line arguments, opened' files.
6. Simple C program that demonstrates the failure of fork system call because of crossing system limits.
7. Simple C programs to demonstrate the use of pipe system call for inter process communication and also emulating piping in shell.
8. Simple C program to use named pipes for inter process communication.
9. Write a C program which emulates simple shell.
10. Write C program to create a thread using pthreads library and let it run its function.

11. Write a C program to illustrate concurrent execution of threads using pthreads library.
12. Write a C program to simulate ptrhead_create function failure by repeatedly calling the same.
13. Write a C program which creates a thread using pthread and passes arguments to the thread function.
14. Write C programs which uses sigset, sifillset, sigprocmask, related system calls and structures.
15. Write a C program to simulate memory segment violation run time error and implement a signal handler (both reliable and unreliable) which handles situation.
16. Write a C program to illustrate the use of sbrk system call.
17. Write a C program to illustrate inter process communication via message queues.
18. Write a C program to illustrate inter process communication via shared memory.
19. Write a C program to simulate producer and consumer problem using semaphores, shared memory, and fork.
20. Write a C program to simulate producer and consumer problem using semaphores, shared memory, and pthread_create.
21. Write a C program to simulate producer and consumer problem using muexes, shared memory, and threads.
22. Write socket Programs in C for Echo/Ping/Talk Commands.
23. Create a Socket (TCP) between two computers and enable file transfer between them.
24. Write a Program to implement Remote Command Execution.

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B.Tech. II Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

DATABASE MANAGEMENT SYSTEMS LAB

Internal Marks : 40

Course Code: P18CSL05 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

1. Understand, analyze and apply SQL commands like DDL,DML,DCL to perform different Database operations
2. Understand and practice PL/SQL block, control statements and cursors.
3. Develop PL/SQL programs using, functions, procedures, packages and Triggers.

Course Outcomes:

1. Know about SQL DDL,DML,DCL,TCL commands
2. Know how to write SQL Quires using set operators
3. Know about how to implement PL/SQL programs using conditional ,loops statements
4. Know about implementing of triggers, cursors and exceptions
5. Know about implementing procedures, functions and packages

PROGRAMS LIST

1. Creation, altering and droping of tables and inserting rows into a table (use constraints
   while creating tables).
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions, string functions and date functions
5. i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section
   ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISEAPPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL
   Statements and write complex functions.
10. Write a PL/SQL block illustrating packages.
11. Write a PL/SQL code using CURSOR.

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B.Tech III Year I Semester

Course Structure			
L	**T**	**P**	**C**
3	**0**	**0**	**3**

COMPUTER NETWORKS

Internal Marks : 40

Course Code: P18CST08 **External Marks: 60**

Course Prerequisites: Fundamentals of Computer.

Course Objectives:

1. Understand state-of-the-art in network protocols, architectures, and applications.
2. To demonstrate the TCP/IP & OSI model merits & demerits.
3. Constraints and thought processes for networking research.
4. Problem Formulation- Approach- Analysis.
5. To know the role of various protocols in Networking.

Course Outcomes:

1. Students to visualize the different aspects of networks, protocols and network design
   models.
2. Students should be understand and explore the basics of Computer Networks and apply Various Protocols to design a network.
3. Student will be in a position to apply the World Wide Web concepts.
4. Students will be in a position to administrate a network and flow of information further.
5. Enables the students to compare and select appropriate routing algorithms for a network.

UNIT I: (9 Lectures)

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet.

Physical Layer: Guided transmission media, Wireless transmission media, Switching Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

UNIT II: (9 Lectures)

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols.

Multiple Access Protocols - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT III: (10 Lectures)

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms, IP addresses, CIDR, Subnetting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT IV: (9 Lectures)

Transport Layer: Services provided to the upper layers elements of transport protocol addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT V: (8 Lectures)

Application Layer- Introduction, providing services.

Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm.

Text Books:

1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu,2010.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH,2013.

References:

1. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education**.**
2. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

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1. en.wikipedia.org/wiki/
2. www.w3schools.com/
3. www.w3.org/
4. http://computing.dcu.ie/~humphrys/ca651/index.html
5. http://www.cs.ccsu.edu/~stan/classes/CS490/Slides/Networks4-Ch4-4.pdf
6. http://ecourses.vtu.ac.in/nptel/courses/Webcourse-contents/IIT-MADRAS/ComputerNetworks/pdf/
7. http://www.solarwinds.com/support/tutorials.aspx

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

OPERATING SYSTEMS

Internal Marks : 40

Course Code: P18CST09 **External Marks: 60**

Course Prerequisites: Computer System fundamentals

Course Objectives:

1. Analyze the tradeoffs inherent in operating system design.
2. Summarize the various approaches to solving the problem of mutual exclusion in an operating system.
3. Understand the principles of Deadlocks.
4. Evaluate the trade-offs in terms of memory size (main memory, cache memory, auxiliary memory) and processor speed.
5. Demonstrate disk storage strategies, file strategies and system protection and security with different crypto models.

Course Outcomes:

1. Describe the important computer system resources and the role of operating system in their management and Identify the System.
2. Design various Scheduling algorithms and Apply the principles of concurrency.
3. Design deadlock prevention and avoidance algorithms.
4. Compare and contrast various memory management schemes.
5. Design and Implement a prototype file systems.

UNIT I: (9 Lectures)

Computer System and Operating System Overview: Overview of Computer System hardware, Operating System Objectives and functions, Evolution of operating System, Operating System Services, System Calls.

Process Management: Process Description, Process Control, Process States, Cooperating Processes , Inter-process Communication.

UNIT II: (9 Lectures)

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Threads Overview, Threading issues.

Synchronization: Background, The Critical-Section Problem, Peterson solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

UNIT III: (8 Lectures)

Dead Locks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT IV: (10 Lectures)

Memory Management Strategies: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table.

VirtualMemory Management: Background, Demand Paging, Page Replacement, allocation of frames, Thrashing.

UNIT V: (9 Lectures)

File system Interface: The concept of a file, Access Methods, Directory structure, File systemmounting, file sharing, protection.

File System implementation: File system structure, allocation methods, freespace management, Massstorage structure, overview of Mass-storage structure, Disk scheduling.

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne
   9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

References:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

Web References:

1. https://nptel.ac.in/courses/106/106/106106144/
2. https://www.tutorialspoint.com/operating_system
3. https://www.youtube.com/playlist?list=PLEJxKK7AcSEGPOCFtQTJhOElU44J_JAun
4. https://www.pdf-archive.com/2016/12/25/operating-system-concepts-9th-edition/operating-system-concepts-9th-edition.pdf.

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	1	0	4

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Internal Marks : 40

Course Code: P18CST10 **External Marks: 60**

Course Prerequisites: None

Course Objectives:

1. To have a basic proficiency in a traditional AI.
2. To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics.
3. Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
4. The ability to implement some basic machine learning algorithms.
5. Understanding of how machine learning algorithms are evaluated

Course Outcomes:

1. Appraise the theory of Artificial intelligence.
2. Illustrate the working of AI Algorithms.
3. Demonstrate the applications of AI.
4. Recognize the characteristics of machine learning that make it useful to real-world Problems.
5. Demonstration of Artificial Neural Networks.

UNIT I: (10 Lectures)

Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of AI languages, current trends in AI.

UNIT-II: (13 Lectures)

Problem solving: state-space search and control strategies, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening A*.

Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

UNIT III: (13 Lectures)

Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames.

UNIT IV: (12 Lectures)

Supervised Learning : Regression Analysis, Linear Regression, Simple Linear Regression, Multiple Linear Regression, Backward Elimination, Polynomial Regression.

Classification : Classification Algorithm , Logistic Regression, K-NN Algorithm, Support Vector Machine Algorithm.

UNIT V: (12 Lectures)

Artificial Neural Network: Introduction, NN representation, Appropriate problems, Perceptron, Back propagation algorithm. **Bayesian Learning:** Introduction, Bayes theorem, Bayes theorem and concept learning.

Text Books:

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011(UNIT-I,UNIT-II,UNIT-III).
2. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge. (UNIT-IV).
3. Machine Learning, Tom M. Mitchell, MGH.(UNIT-V)

References:

1. Elaine Rich, Kevin K and S B Nair, "Artificial Inteligence", 3 rd Edition, McGraw Hill Education, 2017
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

Web References:

1. https://www.tutorialspoint.com/artificial_intelligence/index.htm
2. https://www.javatpoint.com/artificial-intelligence-tutorial
3. https://lecturenotes.in/subject/128/artificial-intelligence-ai

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

PRINCIPLES OF PROGRAMMING LANGUAGES

Internal Marks : 40

Course Code: P18CSE01 **External Marks: 60**

Course Prerequisites: Nil.

Course Objectives:

1. To understand and describe syntax and semantics of programming languages.
2. To understand data, data types, and basic statements.
3. To understand call-return architecture and ways of implementing them.
4. To understand object-orientation, and concurrency in programming Languages.
5. To develop programs in non-procedural programming paradigms.

Course Outcomes:

1. Describe syntax and semantics of programming languages.
2. Explain data, data types, and basic statements of programming languages
3. Design and implement subprogram constructs, Apply object - oriented, and Concurrency programming constructs.
4. Develop programs in Scheme, ML, and Prolog.
5. Understand and adopt new programming languages.

UNIT I: (8 Lectures)

SYNTAX AND SEMANTICS : Evolution of programming languages, describing syntax, language translators, structure of compilers, context free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive - decent bottom - up parsing.

UNIT II: (9 Lectures)

Data, Data Types, And Basic Statements: Names, variables, binding, type checking, scope, scope rules, lifetime of variable, primitive data types, strings, array types, associative arrays, record types, union types, pointers and references, expressions(arithmetic,relational and boolean)overloaded operators, type conversions, assignment statements , mixed mode assignments, control structures – selection, iterations, branching.

UNIT III: (10 Lectures)

Subprograms: Subprograms, design issues, local referencing, parameter passing, design issues for functions.

Implementations: Semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping.

UNIT IV: (9 Lectures)

Object- Orientation, Concurrency: Object – orientation, design issues for OOP languages, implementation of object, oriented constructs, concurrency, semaphores, Monitors, message passing, threads, statement level concurrency.

UNIT V: (9 Lectures)

Functional & Logic Programming Languages: Fundamentals of functional programming languages, Programming with Scheme, – Programming with ML. Introduction to logic and logic programming, – Programming with Prolog.

Text Books:

1. Concepts of Programming Languages, Robert W. Sebesta, Tenth Edition, Addison
   Wesley, 2012.
2. Programming Languages, Principles & Paradigms, 2ed, Allen B Tucker, Robert E
   Noonan, TMH, 2002.

References:

1. The Scheme programming language, R. Kent Dybvig, Fourth Edition, MIT Press, 2009.
2. Elements of ML programming, Jeffrey D. Ullman, Second Edition, Prentice Hall,1998.
3. The craft of Prolog, Richard A. O'Keefe, MIT Press, 2009.
4. Programming in Prolog: Using the ISO Standard,W. F. Clocksin and C. S. Mellish, Fifth Edition, Springer, 2003.

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1. www.geeksforgeeks.org/
2. www.slideshare.net/
3. www.ntu.edu.sg/
4. www.tutorialspoint.com/
5. www.computerscience.org/

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

ADVANCED COMPUTER ARCHITECTURE

Internal Marks : 40

Course Code: P18CSE02 **External Marks: 60**

Course Prerequisites: Programming and Data structures, Discrete Maths, and a basic knowledge of Computer organization.

Course Objectives:

1. Understand the micro-architectural design of processors.
2. Learn about the various techniques to obtain performance improvement and power savings in current processors.

Course Outcomes:

1. Study the Concept of Parallel Processing and its applications.
2. Implement the Hardware for Arithmetic Operations.
3. Analyze the performance of different scalar Computers.
4. Develop the Pipelining Concept for a given set of Instructions.
5. Distinguish the performance of pipelining and non pipelining environment in processor.

UNIT I: (9 Lectures)

Pipeline and vector processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT II: (9 Lectures)

Computer Arithmetic: Addition and Subtraction, Hardware Implementation, Multiplication Algorithms and Hardware Implementation, Division Algorithms and Hardware Implementation, Floating Point Arithmetic Operations.

UNIT III: (9 Lectures)

Parallel Computer Models: Evolution of Computer Architecture, System Attributes to Performance, Shared Memory Multiprocessors, Distributed Memory Multi-computers, Vector Super Computers, SIMD Super Computers.

UNIT IV: (9 Lectures)

Processors and Memory Hierarchy: Advanced Processor Technology: Design Space of Processors, Instruction-Set Architectures, CISC scalar Processors, RISC scalar Processors, Super Scalar and Vector Processors: Super scalar Processors.

UNIT V: (9 Lectures)

Pipelining and Superscalar Techniques: Linear Pipeline Processors: Asynchronous and Synchronous models, Clocking and Timing Control, Speedup, Efficiency and Throughput, Pipeline Schedule Optimization, Instruction Pipeline Design: Instruction Execution Phases, Mechanisms for Instruction Pipelining, Dynamic Instruction Scheduling, Branch Handling Techniques.

Text Books:

1. Computer System Architecture, Morris M. Mano, 3rd edition, Pearson/Prentice Hall India. (UNIT-I,II,III,IV,V)
2. Advanced Computer Architecture, Kai Hwang, McGraw-Hill,India. (UNIT-IV,V)

References:

1. Computer Organization and Achitecture, William Stallings ,8thedition,PHI.
2. Computer Organization, Carl Hamachar, Vranesic,Zaky, 5th edition, McGrawHill.

Web References:

1. https://nptel.ac.in/courses/106/103/106103206/
2. https://www.tutorialspoint.com/parallel_computer_architecture/parallel_computer_architecture_models.htm
3. https://www.scribd.com/presentation/387051239/Mano-Computer-System-Architecture-all-ppt
4. http://wh.cs.vsb.cz/mil051/images/5/54/PAP-PR-01_%C3%9Avod_do_problematiky_z%C5%99et%C4%9Bzen%C3%A9ho_zpracov%C3%A1n%C3%AD_instrukc%C3%AD.pdf

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

COMPUTER GRAPHICS

Internal Marks : 40

Course Code: P18CSE03 **External Marks: 60**

Course Prerequisites: Mathematics

Course Objectives:

1. Gain knowledge on two dimensional graphics and their transformations.
2. Gain knowledge about graphics systems and drawing algorithms.
3. Appreciate illumination and color models.
4. Understand the comparison between two and three dimensional graphics and their transformations.
5. Be familiar with clipping techniques.

Course Outcomes:

1. Apply output primitives on graphics.
2. Design two dimensional graphics, Apply clipping techniques to graphics.
3. Design three dimensional graphics, Transformations.
4. Design RGB Colour models and Apply Illumination and colour models.
5. Design animation sequences with tools.

UNIT I: (9 Lectures)

OVERVIEW OF GRAPHICS SYSTEMS:

Raster scan systems, Random scan systems, Output primitives – points and lines, line drawing algorithms, circle and ellipse generating algorithms, filled area primitives.

UNIT II: (9 Lectures)

TWO DIMENSIONAL GRAPHICS:

Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III: (9 Lectures)

THREE DIMENSIONAL GRAPHICS:

Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surface; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces.

TRANSFORMATION AND VIEWING:
Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations.

UNIT IV: (9 Lectures)
COLOUR MODELS:
RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model.

UNIT V: (9 Lectures)
ANIMATIONS & REALISM ANIMATION GRAPHICS:
Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing – tweening. COMPUTER GRAPHICS REALISM: Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing, Tools like 3D Studio Max, Maya, Blender.

Text Books:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", , 3rd Edition, Addison- Wesley Professional,2013. (UNIT I, II, III, IV).
2. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007 (UNIT V).

References:

1. Donald Hearn and M. Pauline Baker, Warren Carithers,"Computer Graphics With Open GL", 4th Edition, Pearson Education, 2010.
2. Jeffrey McConnell, "Computer Graphics: Theory into Practice", Jones and Bartlett Publishers, 2006.
3. Hill F S Jr., "Computer Graphics", Maxwell Macmillan" , 1990.
4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010.
5. William M. Newman and Robert F.Sproull, "Principles of Interactive Computer Graphics", Mc GrawHill 1978.

Web References:

1. https://nptel.ac.in/courses/106106090/
2. https://www.tutorialspoint.com/computer_graphics/index.htm
3. https://ptgmedia.pearsoncmg.com/images/9780321399526/samplepages/0321399528.pdf

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B.Tech III Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DATA WARE HOUSING AND DATA MINING

Internal Marks : 40

Course Code: P18CSE04 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

1. Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
2. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Course Outcomes:

1. Ability to know the functionalities of data mining and how the data to be preprocessed to improve the data and mining results.
2. Able to Understand different types data preprocessing techniques
3. Able to analyze different types classification and prediction methods.
4. Able to Use various kinds of association rules and association analysis algorithms
5. Ability to Use different types of cluster analysis and mining the complex types of data.

UNIT I: (9 Lectures)

Introduction: Why Data Mining? What Is Data Mining? What Kinds of Data Can Be Mined? What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity

Data Warehouse: What is a data warehouse, Why have a Separate Data Warehouse, differences between operational databases and data warehouses, Data warehouse Architecture.

UNIT II: (10 Lectures)

Data Pre-processing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT III: (9 Lectures)

Association Rules: Basic Concepts and Algorithms: Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm.**(Tan &Vipin)**

UNIT IV: (9 Lectures)

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.**(Tan & Vipin)**

UNIT V: (8 Lectures)

Data Mining Trends and Research Frontiers: Mining Sequence Data: Time series, Symbolic Sequences and Biological sequences, Mining graphs and networks, web mining. **(Han Kamber)**

Text Books:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

References:

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition.TMH.
2. Data and Computer communications, 8/e, William Stallings, PHI.
3. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson.
4. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education.

Web References:

1. .https://nptel.ac.in/courses/106105082/
2. http://www.telecomworld101.com/Intro2dcRev2/pagetoc.html

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B.Tech III Year I Semester

Course Structure

L	T	P	C
0	0	4	2

DESIGN THINKING FOR INNOVATION

Internal Marks : 40

Course Code: P18MCT08 **External Marks: 60**

Course Prerequisites: None

Course Objectives:

1. To bring awareness on design thinking
2. To build creative confidence and equip them for innovation
3. To understand and empathize human need.
4. To generate the ideas for the human need.
5. To evaluate business viability, human desirability and technological feasibility by making prototype.

Course Outcomes:

1. Explain and define the design thinking definition, basic concepts and process.
2. Understand abilities that need for innovation.
3. Analyze the barriers of the innovation.
4. Analyze the human need and the problems of mankind.
5. Demonstrate the idea generation process.
6. Generate and Evaluate deferent ideas.
7. Select best ideas and make prototypes.

Outcome indicates:

1. Assignments
2. Prototype report
3. Prototype
4. Charts by students
5. Store boards

Week		Total hours	Topics
1.	1	1.	What Is Design, What Is Design Thinking, Design Thinking– Importance, and Impact
	2	2.	Historical Perspective of Design Thinking,
	3	3.	Evolution of Design Thinking Definitions and Perspectives
	4	4.	Thinking Definitions and Perspectives & Three Space of Innovation In Design Thinking,

2.	**1**	**5.**	Divergent and Convergent Thinking & Design Thinking Process
	2	**6.**	Design thinking vs Traditional thinking (problem solving)
	3	**7.**	Myths of Innovation
	4	**8.**	Myths of Creativity
3.	**1**	**9.**	Creative Confidence
	2	**10.**	Innovators DNA
	3	**11.**	Concept of flow and purpose
	4	**12.**	Building Design Team
4.	**1**	**13.**	Initial Problem Description - 5why, beginner's mindset
	2	**14.**	Research –persona development
	3	**15.**	Empathy mapping
	4	**16.**	interview with empathy and stories collection
5.	**1**	**17.**	Question the critical assumptions
	2	**18.**	Reframe Problem Definition – (PoV) point of view &power of ten,
	3	**19.**	how might we
	4	**20.**	Nine window tool and daisy map
6.	**1**	**21.**	Ideation and Visualization- Brainstorming
	2	**22.**	SCAMPER
	3	**23.**	Mind mapping
	4	**24.**	sketch –structure idea
7.	**1**	**25.**	Storyboard
	2	**26.**	Customer Co-Creation
	3	**27.**	Provocation
	4	**28.**	Role-play
8.	**1**	**29.**	step-by-step prototyping & low fidelity prototyping
	2	**30.**	Testing Prototyping -feedback capturing grid, conduct A/B testing
	3	**31.**	Experiment grid, user retrospective board
	4	**32.**	Create a Pitch of the prototype

Text Books:

1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, “Exploring
2. Engineering: An Introduction to Engineering and Design”, 4th edition, Elsevier, 2016.
3. David Ralzman, “History of Modern Design”, 2nd edition, Laurence King Publishing Ltd., 2010
4. An AVA Book, “Design Thinking”, AVA Publishing, 2010.

References:

1. G. Pahl, W.Beitz, J. Feldhusen, KH Grote, “Engineering Design: A Systematic Approach”, 3rd edition, Springer, 2007.
2. Tom Kelley, Jonathan Littman, “Ten Faces in Innovation”, Currency Books, 2006.
3. Liedtka, Jeanne and Ogilvie, Timothy, Ten Tools for Design Thinking.
4. The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems By : Michael Lewrick
5. The Myths of Innovation by Scott Berkun ,Publisher(s): O'Reilly Media, Inc.ISBN: 9781449389628.
6. The Myths of Creativity: The Truth About How Innovative Companies and People Generate Great Ideas, D. Burkus. Jossey-Bass, San Francisco, CA (2014), 214 pp., ISBN: 978-1-118-61114-2
7. Creative Confidence: Unleashing the Creative Potential Within Us All by Tom Kelley(Author), David Kelley(Author)
8. The innovator's DNA: mastering the five skills of disruptive innovators Author: Dyer, JeffGregersen, Hal B., 1958-Christensen, Clayton M.Published:Boston, Mass. : Harvard Business Press, [2011].
9. Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
10. The Power of Purpose: Find Meaning, Live Longer, by Richard J. Leider
11. Collective Genius: The Art and Practice of Leading Innovation,Authors: Linda A. Hill, Greg Brandeau, Emily Truelove, Kent Lineback Change by Design, by Tim Brown

ASSESSMENT

Assessment	Internal -100 marks
Assignments	1*5= 25
Report of the prototype	1*5=25
Prototype and presentation	50*1=50

Prototype Making and Evaluation Methods:

1. Prototypes can be made by individuals or teams.
2. Four is Maximum member for the team.
3. HOD of the department and 3 experts evaluating the prototype.
4. HOD act as chairperson for the evaluation team.

Prototype Report:

It can be printed or handwritten

Topics in the report

1. Title of the problem
2. Research work
3. How you redefining the problem
4. Methods used for generation idea
5. Ideas (here multiple ideas can be written)
6. Prototyping process

Assignments:

5 assignments will be given and each assignment carries 5 marks

Assignment topics (tentatively): Faculty has the right to change the topics

1. Collect 50 different design that you think it is wonderful
2. Introspection (confidence, creativity)
3. User interview (video file submission) or story collection
4. Book review
5. HBR articles reading and writing opinion
6. Your thinking on design thinking.

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B.Tech. III Year I Semester

Course Structure

L	T	P	C
2	0	0	0

SOFT SKILLS-II

Course Code: P18MCT10 **Internal Marks: 100**

Course Objectives:

1. To make students industry ready
2. To enhance the quality of their communication skills to compete at global level
3. To understand the importance of ethical values both personally and professionally
4. To have an idea about the importance of Contemporary English usage

Course Outcomes:

1. To enhance soft skills and significance of soft skills in working environment.
2. To develop interpersonal l skills.
3. To become more effective individual through goal/target setting and self motivation.
4. To develop techniques to manage time.
5. To become self confident individual by mastering interpersonal skills, team management skills and leadership skills.

SYLLABUS:

Competency 1: LEXIS

Basic vocabulary -Prefixes, suffixes and root words- Synonyms and Antonyms (part-1), Homonyms.

Competency 2: FUNCTIONAL GRAMMAR

Parts of speech and Tenses - Correction of sentences

Competency 3: COMPOSITION

Topic Sentence - Linkers and Transitions - Kinds of Paragraphs - Writing an essay

Competency 4: READING SKILLS

Skimming, Scanning & Sequencing the text -Understanding Coherence- Reading recall, Speed reading - Identifying gist, cloze tests

Competency 5: CONVERSATION PRACTICE

Developing conversational skills- dialogue writing at different situations: railway stations, airports- exchanging greetings and wishes-giving directions to unknown persons- making enquiries- suggesting to a friend.

Text Books:

1. Communication Skills (For Mumbai University) by Meenakshi Raman and Sangeeta Sharma, OUP, 2009.
2. Essential English Grammar, by Raymond Murphy, CUP.

REFERENCES:

1. Technical Communication – Principles and Practice by Meenakshi Raman and Sangeeta Sharma, 2009- OUP.
2. nglish and Soft Skills by S P Dhanavel, 2010- Orient Black Swan.
3. Keep Talking – Mary Spratt, CUP
4. Effective Presentation Style (A Fifty Minute Series Book) – Steve Mandel.
5. Monarch's Preparation Manual for TOEFL.

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B.Tech III Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

COMPUTER NETWORKS & OPERATING SYSTEMS LAB

Internal Marks : 40

Course Code: P18CSL06 **External Marks: 60**

Course Outcomes:

1. Implement data link layer framing methods.
2. Experiment with error handling methods.
3. Make use of various routing algorithms for effective data transmission.
4. Illustrate various process scheduling algorithms.
5. Explain Page replacement algorithms and file allocation strategies.

Part-A:

1. Implement the data link layer farming methods such as character, character stuffing and bitstuffing.
2. Implement on a data set of characters the three CRC polynomials -CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Implementation of distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Implementation of RSA algorithm.

Part-B:

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Implementation of fork (), wait (), exec() and exit () System calls
3. Simulate the following.
   a) Multiprogramming with a fixed number of tasks (MFT)
   b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate the following page replacement algorithms.

a) FIFO b) LRU c) LFU

6. Simulate the following File allocation strategies
   a) Sequenced b) Indexed c) Linked

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B.Tech III Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING LAB

Internal Marks : 40

Course Code: P18CSL07 **External Marks: 60**

Course Objectives:

1. To introduce students to the basic concepts and techniques of **Machine Learning**.
2. To develop skills of using recent **machine learning** software for solving practical problems.
3. To gain experience of doing independent study and research.

Course Outcomes:

1. Implementation of Find-S and Candidate -Elimination Algorithm.
2. Build an Artificial Neural Network for a training data set.
3. Implementation of various machine learning algorithms.

Experiments:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

HADOOP & BIG DATA

Internal Marks : 40

Course Code: P18CST11 **External Marks: 60**

Course Prerequisites: Fundamentals of Java Programming

Course Objectives:

1. Understand the big data characteristics, importance and HDFS.
2. Apply the MapReduce concepts to work with the big data.
3. Able to Understand Hadoop I/O.
4. Apply Pig latin, Apache Spark tools to solve the word count example.
5. Apply Hive structure to Hadoop data.

Course Outcomes:

1. Understand HDFS Architecture to store the data in a distributed environment
2. Apply MapReduce concepts to work with the big data.
3. Implementation of custom writable in Hadoop I/O.
4. Able to Apply Pig latin, Apache Spark tools to work with big data problems
5. Apply hive client to store and work with big data.

UNIT I: (9 Lectures)

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, Validity), Importance of Big Data.

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT II: (9 Lectures)

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

UNIT III: (9 Lectures)

Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable,

ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators.

UNIT IV: (9 Lectures)

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.

Apache Spark: Introduction to Apache spark, features, components, RDD, installation, writing word count using apache spark, hadoop vs spark.

UNIT V: (9 Lectures)

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

Text Books:

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly 2009 (UNIT-I,II,III,IV,V).
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012 (UNIT-I).

References:

1. Hadoop in Action by Chuck Lam, MANNING Publ.
2. Hadoop in Practice by Alex Holmes, MANNING Publishers
3. Mining of massive datasets, Anand Rajaraman, Jeffrey D Ullman, Wiley Publications.

Web References:

1. https://nptel.ac.in/courses
2. https://www.tutorialspoint.com/spark
3. https://www.youtube.com/watch?v=zez2Tv-bcXY
4. https://www.youtube.com/watch?v=VSbU7bKfNkA

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

WEB TECHNOLOGIES

Internal Marks : 40

Course Code: P18CST12 **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

1. To develop the static web pages using HTML and CSS.
2. To enables the students to identify the fundamental concepts for developing web application using PHP language for server side scripting.
3. To analyze how data can be transported using XML.
4. To develop a web applications with server side programming using java servlets.
5. To develop a web applications with server side programming using JSP.

Course Outcomes:

1. Summarize the basic tags and properties in HTML, XHTML and CSS.
2. Create web pages using .client side scripting, validating of forms and XML.
3. Identify the role of server side scripting using PHP programming
4. Design dynamic web application using server side programming with java servlets.
5. Contrast on how to connect and retrieve data through web page from database using JDBC.

UNIT I: (9 Lectures)

HTML Common tags- List, Tables, images, forms, Frames, Links and Navigation,

CSS: Introduction, CSS Properties, Controlling Fonts, Text Formatting, Pseudo classes, Selectors.

UNIT II: (9 Lectures)

Client side Scripting: Introduction to Javascript: Javascript language – declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model.

UNIT III: (9Lectures)

Introduction to PHP: Creating PHP script, Running PHP script, Declaring variables,

data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

UNIT IV: (9Lectures)

A: Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a servlet, deploying a servlet,

B: The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions.

UNIT V: (9Lectures)

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, JSP application design with MVC, Declaring variables and methods, sharing data between JSP pages, Requests and users passing control and data between pages, Sharing sessions and application data.

JDBC connectivity in JSP: Data base programming using JDBC, Studying javax.sql.* package, Accessing a database from a JSP page, Application specific database actions.

Text Books:

1. Web Technologies, Uttam K Roy, Oxford UniversityPress
2. The Complete Reference PHP – Steven Holzner, TataMcGraw-Hill

References:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPDO'Reilly
3. Java Script, D. Flanagan,O'Reilly,SPD.
4. Beginning Web Programming-Jon DuckettWROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition,Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto,Pearson.

Web References:

1. https://www.w3schools.com/html/
2. https://www.javatpoint.com/servlet-tutorial
3. http://nptel.ac.in/courses/106105084/

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	1	0	4

DESIGN AND ANALYSIS OF ALGORITHMS

Internal Marks : 40

Course Code: P18CST13 **External Marks: 60**

Course Prerequisites: Mathematics, Data Structures

Course Objectives:

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

1. Identify time, space complexities for different problems.
2. Implement Greedy Method to solve Problems.
3. Implement Dynamic Programming technique to solve Problems.
4. Able to apply Backtracking and Branch & Bound Techniques in real-time problems.
5. Analyze the pattern-matching algorithms.

UNIT I: (12 Lectures)

Introduction: What is an Algorithm, Pseudo code Conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notations .
Dived and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort.

UNIT II: (12 Lectures)

The Greedy Method: The General Method, Knapsack Problem, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, Huffman Coding, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT III: (12 Lectures)

Dynamic Programming: The General Method, All Pairs Shortest Paths, Single – Source Shortest paths General Weights, String Edition, 0/1 Knapsack, Travelling Salesperson Problem.

UNIT IV: (12 Lectures)

Backtracking: The General Method, the 8-Queens Problem, Sum of Subsets, Graph

Coloring, Hamiltonian Cycles.

Branch and Bound: The Method, The 15-Puzzle problem, Traveling Salesperson.

UNIT V: (12 Lectures)

NP-Hard and NP-Complete Problems: Travelling salesman problem NP complete, NP-Hard Graph Problem (Clique Decision Problem).

Pattern Matching Algorithms: Knuth-Morris-Pratt KMP String Matching Algorithm, Rabin Karp String Matching Algorithm.

Text Books:

1. Fundamentals of computer algorithms E. Horowitz, S. Sahni , UniversityPress Second Edition and year 1997.
2. Introduction to Algorithms Thomas H. CormenLearning Third edition.

References:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, First edition and year 2006.
2. Algorithm **Design, JonKleinberg, Pearson First edition 2008.**

Web References:

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://slideplayer.com/slide/5877267/

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

COMPILER DESIGN

Internal Marks : 40

Course Code: P18CSE05 **External Marks: 60**

Course Prerequisites: Formal Languages and Automata Theory

Course Objectives:

1. To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
2. Study about syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers.
3. Analyze the intermediate code generation, type checking.
4. Demonstrate the role of symbol table and its organization, Code generation Techniques.
5. Analyze machine independent code optimization and instruction scheduling.

Course Outcomes:

1. Introduce the major concept areas of language translation and compiler design
2. Develop an awareness of the function and complexity of compilers.
3. Provide practical, hands on experience in compiler design
4. Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
5. Analyze about Symbol Tables,Storage allocation Techniques and code optimization techniques.

UNIT I: (9 Lectures)

Overview of language processing – pre-processors – compiler – assembler – interpreters, pre-processors, – linkers & loaders - structure of a compiler – phases of a compiler (TEXT BOOK 2). Lexical Analysis – Role of Lexical Analysis – Lexical Analysis Vs. Parsing – Token, patterns and Lexemes – Lexical Errors – Regular Expressions – Regular definitions for the language constructs – Strings, Sequences, Comments – Transition diagram for recognition of tokens, Reserved words and identifiers,Examples.

UNIT II: (10 Lectures)

Syntax Analysis – discussion on CFG, LMD,RMD, parse trees, Role of a parser – classification of parsing techniques– Brute force approach, left recursion, left factoring, Top down parsing – First and Follow- LL(1) Grammars, Non- Recursive

predictive parsing – Error recovery in predictive parsing.What is bottom up parsing approach, Types of Bottom up approaches; Introduction to simple LR – Why LR Parsers – Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables.
Construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing.Comparison of all bottoms up approaches with all top down approaches.

UNIT III: (8 Lectures)
Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples, abstract syntax trees. Types and declarations, type Checking.

UNIT IV: (10 Lectures)
Symbol tables: use and need of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data, heap management, parameter passing mechanisms, introduction to garbage collection. Reference counting garbage collectors.
Code generation: Issues, target language, Basic blocks & flow graphs, Simple code generator, Peephole optimization, Register allocation and assignment.

UNIT V: (8 Lectures)
Machine independent code optimization – semantic preserving transformations, global common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.

Text Books:

1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Co Sethi, Jeffrey D. Ullman,2nded,Pearson,2007.(UNIT-I,II,III,IV,V)
2. Compiler Design, K. Muneeswaran,Oxford. (UNIT-I, IV, V)

References:

1. Engieering a compiler, 2nd edition, Keith D.Cooper& Linda Torczon, MorganKaufman.
2. Principles of compiler design, V. Raghavan, 2nded, TMH,2011.
3. Compiler construction, Principles and Practice, Kenneth C Louden,CENGAGE
4. ImplementationsofCompiler,AnewapproachtoCompilersincludingthealgebraicmethods,Yunlinsu, SPRINGER
5. Compiler Construction K.Sunitha, Pearson Education
6. Principles of Compiler, Nandini Prasad Pearson Education

Web References:

1. http://www.nptel.iitm.ac.in/downloads/106108052/
2. https://www.gatevidyalay.com/compiler-design/
3. https://www.tutorialspoint.com/compiler_design/index.htm
4. https://www.cs.virginia.edu/~weimer/2008-415/reading/RemovingLeftRecursion.pdf
5. http://www.cs.clemson.edu/course/cpsc827/material/LRk/LR%20Error%20Recovery.pdf
6. http://textofvideo.nptel.iitm.ac.in/106108052/lec10.pdf
7. http://www.isi.edu/~pedro/Teaching/CSCI565-Spring15/Practice/SDT-Sample.pdf
8. http://web.cecs.pdx.edu/~harry/compilers/slides/Optimize2.pdf
9. https://lambda.uta.edu/cse5317/fall02/notes/node39.html

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

DISTRIBUTED SYSTEMS

Internal Marks : 40

Course Code: P18CSE06 **External Marks: 60**

Course Prerequisites: Operating System and Object Oriented Programming.

Course Objectives:

1. To demonstrate the fundamentals of distributed systems.
2. To make the students learn different System Models.
3. To impart the knowledge on IPC mechanisms in distributed systems.
4. To facilitate the students understand Remote Procedure Calls.
5. To enable the students know the importance of Operating System in Distributed Systems.
6. To provide knowledge on Transactions and Replications.

Course Outcomes:

1. Analyze the basic concepts and Various System Models in distributed system.
2. Illustrate the Inter process Communication used in TCP and UDP.
3. Compare RMI with RPC in the implementation of Remote Invocations.
4. Summarize Operating System support and Distributed File Systems.
5. Demonstrate Transactions and Replications with real time examples.

UNIT I: (9 Lectures)

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Challenges.

System Models: Introduction, Architectural Models,Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT II: (9 Lectures)

Interprocess Communication: Introduction, The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

UNIT III: (9 Lectures)

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI,

Invocation Semantics, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Case Study: JAVA RMI.

UNIT IV: (9 Lectures)

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads - Creation of a New Process

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

UNIT V: (9 Lectures)

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.

Transactions & Replications: System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.

Text Books:

1. Distributed Systems- Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg, 4th Edition, Pearson Publication.
2. Distributed Computing, Principles, Algorithms and Systems, Ajay D Kshemkalyani, Mukesh Sighal, Cambridge, University Press, 2011.

References:

1. Distributed Computing – Principles and Applications, M.L. Liu, AddisonWesley, Pearson Education, 2004.
2. Distributed Systems- Principles and Paradigms, Tanenbaum A.S., Van Steen M., Pearson Education, 2007.
3. Distributed Computing: Fundamentals, Simulations and Advanced Topics, Hagit Attiya and Jennifer Welch, Wiley, 2004. 4. Distributed Algorithms, Nancy A Lynch, Morg

Web References:

1. nptel.ac.in/courses/106106168/
2. http://db.uwaterloo.ca/~tozsu/courses/cs454
3. http://cse.iitkgp.ac.in/~agupta/distsys/index.html
4. http://www.cis.upenn.edu/~lee/03cse380/lectures/ln19-ds-v3.4pp.pdf
5. http://www.cloudbus.org/652/LectureSlides.html.

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

MIDDLEWARE TECHNOLOGIES

Internal Marks : 40

Course Code: P18CSE07 **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

1. The course provides details about the modern component platforms.
2. Based on practical examples, details about modern middleware technologies will be analyzed.
3. Students get the chance to gain in-depth knowledge about their favorite middleware platform.

Course Outcomes:

1. Have learnt the different types of server client concepts.
2. Learn the design of EJB architecture.
3. Deploy EJB for specific applications.
4. Build an application using CORBA.
5. Build an application using COM.

UNIT I: (9 Lectures)

CLIENT / SERVER CONCEPTS:

Client – Server – File Server, Database server, Group server, Object server, Web server .Middleware – General Middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

UNIT II: (9 Lectures)

EJB ARCHITECTURE:

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT III: (9 Lectures)

EJB APPLICATIONS:

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

UNIT IV: (9 Lectures)

CORBA:

CORBA – Distributed Systems – Purpose - Exploring CORBA alternatives –

Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB - Building an application with CORBA.

UNIT V: (9 Lectures)

COM:

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling -Remoting.

Text Books:

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd.,2002.
2. Tom Valesky,"Enterprise Java Beans", Pearson Education,2002.

References:

1. Jesse Liberty, "Programming C#", 2nd Edition, O'Reilly Press, 2002.
2. Mowbray, "Inside CORBA", Pearson Education, 2002.
3. Jason Pritchard,"COM and CORBA side by side", Addison Wesley,2000.

Web References:

1. https://www.tutorialspoint.com/ejb/index.htm
2. https://www.ece.uvic.ca/~itraore/seng422-06/notes/arch06-6-1.pdf
3. https://nptel.ac.in/content/storage2/courses/106105087/pdf/m17L42.pdf

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B.Tech III Year II Semester

Course Structure

L	T	P	C
3	0	0	3

CRYPTOGRAPHY & NETWORK SECURITY

Internal Marks : 40

Course Code: P18CSE08 **External Marks: 60**

Course Prerequisites: Computer Networks

Course Objectives:

1. The main objective of this course is to teach students to understand and how to address various software security problems in a secure and controlled environment.
2. During this course the students will gain knowledge in various kinds of software security problems, and techniques that could be used to protect the software from security threats.

Course Outcomes:

1. Evaluate the use of encryption algorithm for achieving data confidentiality.
2. Apply Secure hash functions for attaining data integrity.
3. Analyse the security mechanisms for achieving authentication.
4. Analyse the protocols for achieving availability, access control to resources and protocols for non-repudiation
5. Explore the threats and remedial measures for system security .

UNIT I: (10 Lectures)

Introduction: Security Attacks(Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Availability) and Mechanisms, A Model for Internetwork security.

Symmetric Key Cryptography: Symmetric Encryption Principles, Symmetric Encryption Algorithms (DES,Triple DES and AES), Cipher Block Modes of Operations.

UNIT II: (8 Lectures)

Public-Key Cryptography and Message Authentication: Approaches to Message Authentication, Secure Hash Functions, Message Authentication Codes, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures.

UNIT III: (9 Lectures)

Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

UNIT IV: (9 Lectures)

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V: (9 Lectures)

Intruders and Malicious Software: Intruders, Intrusion Detection, Viruses and Related Threats, Trusted System.

Firewalls: Firewalls-Characteristics, Types of Firewalls, Placement of Firewalls, Firewall Configuration.

Text Books:

1. Cryptography and Network Security: Principles and Practice,6th Edition, William Stallings, Pearson Education,2011.
2. Network Security Essentials (Applications and Standards), William Stallings, Pearson Education.
3. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC Press, 2013.

References:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press).
2. Principles of Information Security, Withman , Thomson.
3. Introduction to Cryptography, Buchmann, Springer.

Web References:

1. https://onlinecourses.nptel.ac.in/noc18_cs07/preview
2. https://www.coursera.org/learn/cryptography
3. https://www.coursera.org/specializations/computer-network-security
4. https://www.youtube.com/watch?v=Q-HugPvA7GQ&list=PL71FE85723FD414D7

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B.Tech. III Year II Semester **Course Structure**

L	T	P	C
2	0	0	0

SOFT SKILLS-III

Course Code: P18MCT12 **Internal Marks: 100**

Course Objectives:

1. Understand and apply the principles of professional communication to a variety of professional / workplace contexts.
2. Understand the fundamentals of organizational behavior.
3. Strengthen skills in writing, research and presenting.
4. Articulate oral and written messages in a clear, appropriate and persuasive manner to suit specific purposes, audiences and contexts at work place.
5. Understand the importance of Culture in organizational communication.
6. Understand the importance of ethics in workplace.
7. Apply various theories and resolve ethical dilemmas.
8. Evaluate ethical decisions

Course Outcomes:

1. Understanding the principal's, skills and behavioral styles of professional communication
2. Evaluate and interpret Different written communications in Business.
3. Able to Apply cooperate communication with professionalism
4. Understand Different cultural contexts and communicate in the context.
5. Demonstrate Ethical values in professional and personal life

Competency 1: Professional Communication

An Overview of Professional Communication – Communication Principles - 5 Essential Professional Communication Skills –Visual Communication – Communication Networks - Behavioral Styles.

Competency 2: Business Writing

What and why of Business Writing - Business Vocabulary - Giving and Writing Instructions - Media Communication – Multi Channel Communication - Email Etiquette - Writing Executive Summary – Report Writing – Progress Reports – Investigative Reports.

Competency 3: Corporate Communication

Neo Professionalism - Telephone Etiquette - Teleconferencing - Face to Face Communication - Managing Social Networking as Interpersonal Communication - Effective human relations at workplace - Prioritization -

Competency 4: Cross Cultural Communication

An Overview - High and Low Context Cultures - Understanding Cultural Diversity- Awareness of Individual Cultures and Cultural Tolerance – Importance of Non Verbal Communication Across Cultures- Tactics and Timing - - Managing Conflict - Negotiation - Culture as Context for Communication - Case studies and discussions.

Competency 5: Professional Ethics

An Overview - Core values of an Individual - Business - Organization - Code of Ethics and Challenges.Professionalism at Workplace – Trends – Tenets – Taboos - Harassment and Misconduct - Equal opportunity - Discrimination – Diversity - Use of State Property and Intellectual Property- Plagiarism - Explain wrong doing- Risk taking

References:

1. Business Communication for managers: An advanced approach, by Penrose, Cengage learning.
2. Inter cultural communication for business by O'Rourke & Tuleja, Cengage learning
3. Professional Communication in Engineering. by. Palgrave Macmillan 2009.
4. Business Communication by Nawal. Cengage Learning Publishers
5. Communication for professional engineers by W. P. Scott, Bertil Billing. Thomas Telford, 1998
6. The Skills of Negotiating by. Wildwood House, 1981.
7. Understanding Professional Ethics Kaplan's publishing.
8. Reason and professional ethics by Ashgate Publishing, Ltd., 2009.
9. Cross Cultural and Inter Cultural Communication. by William B. Gudykunst. Sage Publications India Pvt Ltd, New Delhi.2003.
10. Corporate Communications: Theory and Practice. by Sage Publications India Pvt Ltd, New Delhi.2004.

Related Activities

- Presentation of one's own work. Eg Corporate Information – Profile of Company.
- Analysis of a company's strengths and weaknesses, general and financial
- Comparing company Work culture and Nature.
- Simulated negotiations and business meetings
- Handling personnel matters – eg Time management, Communication at work.
- Role plays of chairing business meetings and negotiations.
- Professional hospitality, entertaining visitors and handling social situations, using the telephone.
- Intercultural understanding Case studies and discussions

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B.Tech III Year II Semester

Course Structure

L	T	P	C
0	0	2	1

HADOOP & BIG DATA LAB

Internal Marks : 40

Course Code: P18CSL08 **External Marks: 60**

Course Objectives:

1. Learning the installation of Hadoop in Different Operating Modes.
2. Implementation various file Operations in Hadoop Environment.
3. Implementation of Map Reduce Paradigm in real time scenario
4. Learning the Installation of pig Latin scripts.
5. Able to implement different operation on tables like Creating the Functions, Indexes, tables.etc Hive

Experiments:

1. Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed
   a. Local
   b. Pseudo distributed
   c. Fully Distributed
2. Implement the following file management tasks in Hadoop:
   Adding files and directories
   Retrieving files
   Deleting files
   Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
4. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
5. Install and Run Pig
6. Write Pig Latin scripts to sort, group, join, describe, and filter your data.
7. Install and Run Hive
8. Hive to create, alter, and drop databases, tables, views, functions, and indexes

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B.Tech III Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

WEB TECHNOLOGIES LAB

Internal Marks : 40

Course Code: P18CSL09 **External Marks: 60**

Course Prerequisites: Object Oriented Programming

Course Objectives:

1. To develop the static web pages using HTML and CSS.
2. To enables the students to identify the fundamental concepts for developing web application using PHP language for server side scripting.
3. To analyze how data can be transported using XML.
4. To develop a web applications with server side programming using java servlets.
5. To develop a web applications with server side programming using JSP.

Course Outcomes:

1. Create a static web pages using HTML andCSS.
2. Develop JavaScript code for datavalidation.
3. Integrate frontend and backend technologies in client-serversystems.
4. Design dynamic web applications using PHP andJSP.
5. Demonstrate database connectivity for developing webapplications.

The students have to choose one of the following project and do the all 12 experiments related to that project.

1. Training and placementcell.
2. School EducationSystem.
3. University ManagementSystem.
4. Hospital ManagementSystem.

The following are the experiments related to Training and Placement cell project. For the remaining projects, the concern lab instructor has to decide the experiments according to the websites given as examples.

List of Experiments

Experiment 1: Design the following static web pages required for a Training and placement cell web site.

1) Home Page 2) Login Page 3) Registration page

Experiment 2: 4) Company Details Page 5) Alumni Details Page 6) Placement Staff Details Page

Experimen 3: 7) Student personal Info Page 8) Student Academic Info page 9) Semester Wise Percentage & their Aggregate page

Experiment 4: Validate login page and registration page using regular expressions.

Experiment 5: Apply different font styles, font families, font colors and other formatting styles to the above static web pages.

Experiment 6: Install wamp server and tomcat server, access above developed static web pages using these servers.

Experiment 7: Write a servlet/PHP to connect to the database, Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration.

Experiment 8: Write a JSP/PHP to connect to the database, Insert the details of the student academic information with student academic info page.

Experiment 9: User Authentication:
Assume four users user1user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in thecookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ".
Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters()method.

Experiment 10: Write a JSP which does the following job:
Authenticate the user when he submits the login form using the user name and password from the database.

Experiment 11: write a JSP to insert the student's semester wise percentages and calculate aggregate and insert into database.

Experiment 12: write a JSP to search the students according to their aggregate and produce sorted list or according to their Enroll number.

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B.Tech IV Year - I Semester

Course structure

L	T	P	C
3	1	0	4

Web Development Using MEAN Stack

Course Code: P18CST14 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: HTML, JAVA Script

Course Objectives:

This course is designed to introduce students to learn how to design both the front and back end of web applications. The course will introduce web-based media-rich programming tools for creating interactive web pages.

Course Outcomes:

At the end of this course the student will be able to

1. Apply Angular8 to develop web applications.
2. Make use of Forms and Services.
3. Utilize Node.js to create Server Side Applications.
4. Make use of Express to deploy web applications.
5. Experiment with NoSQL using MongoDB.

UNIT-I: (11 Lectures)

Angular8: Introduction, Installation, Creating First Angular8 Application, Architecture, Angular Components and Templates, Data Binding, Directives, Pipes, Services and Dependency Injection.

Unit-II: (12 Lectures)

Angular8: Reactive Programming, HTTP Client Programming, Angular Material, Routing and Navigation, Forms, Form Validation, CLI Commands.

UNIT-III (13 Lectures)

Node.js: Introduction, Node.js Process Model, Node.js Console, Node.js Basics, Node.js Modules, Local Modules, Export Module, Node Package Manager, Node.js Web Server..

UNIT-IV (12 Lectures)

Node.js Contd. & Express.js: Node.js File System, Node.js Event Emitter,

Express.js: Express.js Web App, Serving Static Resources.

UNIT-V (12 Lectures)

MongoDB: Access MongoDB in Node.js, Connecting and Creating Database in MongoDB, Insert Documents, Update Documents, Delete Documents, Query Database.

Text Books:

1. Node.js, MongoDB and Angular Web Development by Brad Dayley, Brendan Dayley-2nd Edition – Addison –Wesley.
2. Getting MEAN with Mango, Express, Angular and Node by Simon Holmes, Clive Harber-2nd Edition - Manning Publications.
3. MEAN Cookbook by Nicholas McClay- Packt.

Reference Books:

1. Node.js: Web Development for Beginners by Joseph Conner.
2. Mean Stack Developer by Camila Cooper.

Web References:

1. https://www.tutorialspoint.com/angular8/index.htm.
2. https://www.edx.org/course/introduction-to-mongodb-using-the-mean-stack.
3. https://www.simplilearn.com/full-stack-web-developer-mean-stack-certification-training.
4. https://www.tutorialsteacher.com/nodejs/expressjs-web-application.

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

Object Oriented Analysis and Design with UML

Internal Marks : 40

Course Code: P18CST15 **External Marks: 60**

Course Prerequisites: OOP concepts.

Course Objectives:

1. The main objective of this course is that the students become familiar with all phases of OOAD and master the main features of the UML.
2. The students know about the main concepts of Object Technologies, how to apply them at work, ability to analyze and solve challenging problem in various domains.
3. Student will use systematic approach that focus and describe abstract systems of interaction between classes and objects..

Course Outcomes:

1. Ability to find solutions to the complex problems using object oriented approach.
2. Identify classes and responsibilities of the problem domain
3. Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.
4. Apply Basic and Advanced Structural Modeling Concepts for designing real time applications.
5. Analyze Dynamic Aspects of a system using Behavioral Diagrams and Runtime environment of Software Systems.

UNIT I: (7 Lectures)

Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.

UNIT II: (7 Lectures)

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects.

UNIT III: (9 Lectures)

Introduction to UML: Why We Model: History of UML, The Importance of Modeling, Principles of Modeling,An Overview of the UML, Conceptual Model of the UML, Architecture, and Software Development Life Cycle.

UNIT IV: (10 Lectures)

Structural Modeling: Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams and Class Diagrams.

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, and Object Diagrams.

UNIT V: (12 Lectures)

Behavioral Modeling: Basic Behavioral Modeling: Interactions, Interaction Diagrams, Use Cases, Use Case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling: Events and Signals, State Machines, Time and Space, State Diagrams.

Architectural Modeling: Component and Deployment Diagrams.

Text Books:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON.
2. 2. "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

References:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O"Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning

Web References:

1. https://www.uml-diagrams.org/class-reference.html
2. https://www.webagesolutions.com/courses/TP1136-ooad-with-uml
3. https://onlinecourses.nptel.ac.in/noc20_cs59/preview
4. https://www.youtube.com/watch?v=d0iIWDsXJCQ

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

SOFTWARE TESTING METHODOLOGIES

Internal Marks : 40

Course Code: P18CSE09 **External Marks: 60**

Course Prerequisites: Software Engineering

Course Objectives:

- The primary objective of this course is to know the importance of automation testing compared with manual testing and importance of testing in real life while developing any product/project which reduces the risk of a developer.
- To know how to prepare testing techniques by using flow graph, transition flows and reduction of path expressions.
- To study fundamental concepts in software testing including software testing objectives, process, criteria, strategies, and methods.

Course Outcomes:

1. Interpret a model for testing and understand the process of testing.
2. Visualize control flow graph and demonstrate complete path testing to achieve C1+C2 and identify the complications in a transaction flow testing and anomalies in data flow testing.
3. Apply reduction procedures to control flow graph and simplify it into a single path expression.
4. Able to understand the use of decision tables and KV charts in test case design.
5. Identify effective approach for node reduction. And able to apply different testing tools to resolve the problems in Real time environment.

UNIT I: (8 Lectures)

Introduction: Purpose of Testing, Dichotomies, model for testing, consequences of bugs, Taxonomy of bugs.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to development life cycle Software Testing.

UNIT II: (10 Lectures)

Flow Graphs and Path testing: Basic concepts, Predicates, Path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Transaction flow testing: Transaction flows, transaction flow testing techniques.

Data flow testing: Basics of Data flow testing, strategies in dataflow testing, application of dataflow testing

UNIT III: (9 Lectures)

Paths, path products and Regular expressions: Path products & Path expression, reduction procedure, applications, regular expressions and flow anomaly detection.

UNIT IV: (9 Lectures)

Logic Based Testing: Overview, decision tables, path expressions, kv charts, specifications

State, state graphs and Transition Testing: State Graphs, good and bad state graphs, state testing, testability tips.

UNIT V: (9 Lectures)

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

Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, Win runner, Load Runner, Jmeter, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints,Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

Text Books:

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing- Yogesh Singh, Camebridge

References:

1. Brain Marick; ―The Craft of Software Testing‖; Prentice Hall Series in innovative technology.
2. RenuRajaniPradeep Oak; ―Software Testing,Effectivemethods,Tools and Techniques‖;TMHI
3. Dr.K.V.K.K.Prasad, ―Software Testing Tools‖ –Dreamtech.
4. Edward Kit, ―Software Testing in the Real World‖ –Pearson.
5. Perry, ―Effective methods of Software Testing‖, John Wiley.

Web References:

1. https://freevideolectures.com › Computer Science › IIT Bombay
2. https://www.youtube.com/watch?v=gPE9emPFrwo
3. https://nptel.ac.in/courses/106105150
4. www.softwaretestinghelp.com
5. https://www.atlassian.com/landing/software-testing/

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

BLOCKCHAIN TECHNOLOGY

Internal Marks : 40

Course Code: P18CSE10 **External Marks: 60**

Course Prerequisites: Cryptography.

Course Objectives:

1. The students to explore the driving force behind the crypto currency Bit coin.
2. Along with the Decentralization, Cryptography,
3. Bit coins with its alternative coins,
4. Smart contracts and outside of currencies.

Course Outcomes:

1. Understand the types, benefits and limitation of blockchain.
2. Explore the blockchain decentralization and cryptography concepts.
3. Enumerate the Bitcoin features and its alternative options.
4. Describe and deploy the smart contracts
5. Summarize the blockchain features outside of currencies.

UNIT I: (9 Lectures)

Introduction: Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.

UNIT II: (9 Lectures)

Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations.

Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys.

UNIT III: (10 Lectures)

Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B:Alternative Coins, Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash..

UNIT IV: (9 Lectures)

Smart Contracts and Ethereum: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.

UNIT V: (8 Lectures)

Alternative Blockchains: Blockchains Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, Media.

Text Books:

1. Mastering Blockchain - Distributed ledgers, decentralization and Smart contracts explained, Author- Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1- 78712-544-5, 2017.

References:

1. Bitcoin and Crypto currency Technologies, Author- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University, 2016
2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Author- Daniel Drescher, Apress, First Edition, 2017
3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014

Web References:

1. https://www.javatpoint.com/blockchain-tutorial
2. https://www.tutorialspoint.com/blockchain/index.htm
3. https://www.guru99.com/blockchain-tutorial.html
4. https://www.simplilearn.com/tutorials/blockchain-tutorial

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DEEP LEARNING

Internal Marks : 40

Course Code: P18CSE11 **External Marks: 60**

Course Prerequisites: Artificial Intelligence, Machine Learning

Course Objectives:

1. Understand complexity of Deep Learning algorithms and their limitations.
2. Understand modern notions in data analysis oriented computing.
3. Be capable of confidently applying common Deep Learning algorithms in practice and implementing their own.
4. Be capable of performing distributed computations.
5. Be capable of performing experiments in Deep Learning using real-world data.

Course Outcomes:

1. Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.
2. Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
3. Understand the language and fundamental concepts of artificial neural networks
4. Troubleshoot and improve deep learning models
5. Build own deep learning project
6. Differentiate between machine learning, deep learning and artificial intelligence

UNIT I: (9 Lectures)

Introduction to Machine Learning : Supervised and Unsupervised learning,Linear Models, Perceptrons: What is a Perceptron, XOR Gate

Introduction to TensorFlow : Computational Graph, Key highlights, Creating a Graph, Regression example.

UNIT II: (9 Lectures)

Activation Functions : Sigmoid,ReLU, Hyperbolic Fns,Softmax Artificial Neural Networks : Introduction, Perceptron Training Rule, Gradient Descent Rule.

Gradient Descent and Backpropagation: Gradient Descent, Stochastic Gradient Descent, Backpropagation, Some problems in ANN.

UNIT III: (10 Lectures)

Optimization and Regularization :Overfitting and Capacity, Cross Validation,Feature Selection, Regularization, Hyperparameters

Autoencoders (standard, sparse, denoising, contractive, etc), Adversarial Generative Networks, Autoencoder and DBM.

UNIT IV: (9 Lectures)

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications **Introduction to Recurrent Neural Networks**: Introduction to RNNs, Unfolded RNNs, Seq2Seq RNNs, LSTM, RNN applications.

UNIT V: (8 Lectures)

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics.

Text Books:

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

References:

1. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
2. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
3. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw- Hill Education, 2004

Web References:

1. https://www.ibm.com/cloud/learn/deep-learning
2. https://en.wikipedia.org/wiki/Deep_learning
3. https://www.geeksforgeeks.org/introduction-deep-learning/

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B.Tech IV Year - I Semester

Course structure

L	T	P	C
3	0	0	3

WIRELESS NETWORKS AND MOBILE COMPUTING

Course Code: P18CSE12 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: Nil

Course Objectives:

1. To make the student understand the concept of mobile computing paradigm, its applications and limitations.
2. To understand the typical mobile networking infrastructure through GSM.
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.
4. To understand the ad hoc networks and related concepts.

Course Outcomes:

At the end of this course the student will be able to

1. Compare the various types of Wireless Networks from teaching perspective.
2. Interpret the applications and architecture of Mobile Computing and multiplexing techniques.
3. Analyze the Mobile IP issues.
4. Analyze the various Mobile TCP Variants.
5. Analyze the various routing protocols in MANET.

UNIT-I: (8 Lectures)

Wireless Networks: Computing Networks, types of networks, wired networks, wireless networks, Generation of Wireless Networks: 2G, 3G, 4G, Cellular Networks, Mobile Ad Hoc Networks, Mesh Networks, Sensor Networks, Vehicular Adhoc Networks, Next Generation Networks.

Unit-II: (9 Lectures)

Mobile Computing: Architecture of Mobile Computing, Mobile Computing Applications, Limitations of Mobile Devices

GSM: Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT-III (12 Lectures)

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

Mobile Network Layer: Mobile IP- Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunnelling and encapsulation, optimizations, Dynamic Host Configuration Protocol (DHCP).

UNIT-IV (8 Lectures)

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-V (8 Lectures)

Mobile Ad hoc Networks (MANETs): Introduction, Characteristics, Applications & Challenges of a MANET, Routing, Proactive, Reactive and Hybrid Routing Algorithms.

Text Books:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, 2nd edition, 2004.
2. Rajkamal, "Mobile computing" Second Edition ,Oxford University Press.

Reference Books:

1. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden ,Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. MartynMallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

Web References:

1. https://www.youtube.com/watch?v=Eu_mTZxPofI
2. https://slideplayer.com/slide/4810167/
3. https://www.tutorialspoint.com/mobile_computing/mobile_computing_useful_resources.htm.
4. http://www.freepdfbook.com/mobile-communications-jochen-schiller/

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

MULTIMEDIA APPLICATION DEVELOPMENT

Internal Marks : 40

Course Code: P18CSE13 **External Marks: 60**

Course Prerequisites: Nil.

Course Objectives:

1. To give each student a firm grounding in the fundamentals of the underpinning technologies in graphics, distributed systems and multimedia
2. To teach students about the principled design of effective media for entertainment, communication, training and education
3. To provide each student with experience in the generation of animations, virtual environments and multimedia applications, allowing the expression of creativity
4. To provide each student with a portfolio of their own completed work at the end of the programme.

Course Outcomes:

1. Demonstrate knowledge and understanding of the concepts, principles and theories of Multimedia Applications and Virtual environments
2. Demonstrate knowledge and understanding of the current issues involved with development and deployment of multimedia system
3. Analyze and solve problems related to their expertise in Multimedia Applications
4. Demonstrate their ability to extend their basic knowledge to encompass new principles and practice
5. Demonstrate their computing, technical and theoretical skills by developing a substantial Multimedia application.

UNIT I: (7 Lectures)

Fundamental concepts Fundamental concepts in Text and Image: Multimedia and hypermedia. World Wide Web, overview of multimedia software tools.

Graphics and Image data representation graphics/image data types, file formats.

UNIT II: (7 Lectures)

Color in image and video Color in image and video: color science, color models in images, color models in video.

Basic concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT III: (12 Lectures)

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding

Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zero tree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT IV: (10 Lectures)

Video Compression Techniques: Introduction to video compression. Video compression based on motion compensation. Search for motion vectors. MPEG.

Basic Audio Compression Techniques: ADPCM, Vocoders, Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP. MPEG Audio Compression: Psychoacoustics, Equal-Loudness Relations, Frequency Masking, Temporal Masking, MPEG Audio, MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithm, MPEG-2 AAC (Advanced Audio Coding).

UNIT V: (9 Lectures)

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

Text Books:

1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHIl l Pearson Education
2. Multimedia System Design, Andleigh and Thakarar , PHI
3. Multimedia Technology & Application, David Hillman, Galgotia Publications.

References:

1. Rajan Parekh “Principles of Multimedia” (Tata McGraw-Hill)
2. S.J.Gibbs & D.C.Tsichritzis “Multimedia Programming”, Addison Wesley 1995
3. P.W.Agnew & A.S.Kellerman “Distributed Multimedia”, AddisonWesley 1996
4. C.A.Poynton, “A Technical Introduction to Digital Video” Wiley1996
5. F.Fluckiger, “Understanding Networked Multimedia”, Prentice- Hall 1995

Web References:

1. https://www.tutorialspoint.com/multimedia/index.htm
2. https://www.wisdomjobs.com/e-university/multimedia-tutorial-270.html
3. https://dokumen.tips/documents/the-manualscom-fundamentals-of-multimedia-by-ze-nian-li-and-mark-s-drew-solution-manual.html
4. https://www.academia.edu/34336904/Fundamentals_of_Multimedia

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

DATA SCIENCE

Internal Marks : 40

Course Code: P18CSE14 **External Marks: 60**

Course Prerequisites: Programming and Data structures, Discrete Maths, and a basic knowledge of Computer organization.

Course Objectives:

1. To understand the mathematical foundations required for data science.
2. To describe a flow process for data science problems.
3. To introduce basic data sampling.
4. To learn Hypothesis Testing.
5. To learn the ideas and tools for data visualization.

Course Outcomes:

1. Explain the basic terms of Linear Algebra and Statistical Inference.
2. Describe the Data Science process and how its components interact.
3. Understand the various distribution and sampling.
4. Perform Hypothesis Testing on datasets.
5. Apply statistical inference for Regression.

UNIT I: (9 Lectures)

LINEAR ALGEBRA: Algebraic view – vectors 2D, 3D and nD, matrices, product of matrix & vector, rank, null space, solution of over determined set of equations and pseudo-inverse. Geometric view - vectors, distance, projections, eigenvalue decomposition, Equations of line, plane, hyperplane, circle, sphere, Hypersphere.

UNIT II: (9 Lectures)

PROBABILITY AND STATISTICS: Introduction to probability and statistics, Population and sample, Normal and Gaussian distributions, Probability Density Function, Descriptive statistics, notion of probability, distributions, mean, variance, covariance, covariance matrix.

UNIT III: (9 Lectures)

DATA SAMPLING AND DISTRIBUTION:

Normalization, Sampling Data-Simple Random sampling, Stratified, Cluster Sampling, Sampling Error/Bias. Bootstraping, Central Limit Theorem, Confidence intervals, Normal distribution, Binomial distribution, Poisson distribution

UNIT IV: (9 Lectures)

HYPOTHESIS: A/B Testing, Hypothesis Tests- null, one-way, two-way, P-value, Type 1 & 2 errors, t-tests, multiple testing, degrees of freedom, ANOVA, Chi-Square Tests, Power and Sample Size.

UNIT V: (9 Lectures)

REGRESSION AND PREDICTION: Simple Linear Regression, Multiple Linear Regression, Confidence and Prediction Intervals, Categorical Variables, Multi collinearity, Polynomial Regression.

Text Books:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.
2. Bruce, Peter, and Andrew Bruce. Practical statistics for data scientists: 50 essential concepts. " O'Reilly Media, Inc.", 2017.
3. Introduction to Linear Algebra - By Gilbert Strang, Wellesley-Cambridge Press, 5th Edition.2016.
4. Applied Statistics and Probability For Engineers – By Douglas Montgomery.2016.

References:

1. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014. (free online)

Web References:

1. https://leanpub.com/LittleInferenceBook
2. https://www.coursera.org/learn/statistical-inference
3. https://www.datacamp.com/community/open-courses/statistical-inference-and-data-analysis

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

SOFT COMPUTING

Internal Marks : 40

Course Code: P18CSE15 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

To introduce the concepts in Soft Computing such as Artificial Neural Networks, Fuzzy logic- based systems, genetic algorithm-based systems and their hybrids.

Course Outcomes:

1. To Learn about soft computing techniques and their applications.
2. To Analyze various neural network architectures.
3. To Define the fuzzy systems.
4. To Understand the genetic algorithm concepts and their applications.
5. To Identify and select a suitable Soft Computing technology to solve the problem; construct a solution.

UNIT I: (8 Lectures)

Introduction to Soft Computing: Artificial neural networks - biological neurons, Basic models of artificial neural networks – Connections, Learning, Activation Functions, McCulloch and Pitts Neuron, Hebb network.

UNIT II: (9 Lectures)

Artificial Neural Networks : Perception networks – Learning rule – Training and testing algorithm, Adaptive Linear Neuron, Back propagation Network – Architecture, Training algorithm.

UNIT III: (10 Lectures)

Fuzzy Logic and Fuzzy systems:

Fuzzy logic - fuzzy sets - properties - operations on fuzzy sets, fuzzy relations - operations on fuzzy relations.

Fuzzy systems: Fuzzy membership functions, fuzzification, Methods of Membership value assignment - intuition-inference-rank ordering, Lambda –cuts for fuzzy sets, Defuzzification methods.

UNIT IV: (9 Lectures)

Genetic Algorithms: Truth values and Tables in Fuzzy Logic, Fuzzy propositions, Formation of fuzzy rules -Decomposition of rules –Aggregation of rules, Fuzzy

Inference Systems – Mamdani and Sugeno types, Neuro-fuzzy hybrid systems – characteristics – classification.

UNIT V: (9 Lectures)

Hybrid systems: Introduction to genetic algorithm, operators in genetic algorithm - coding - selection - cross over – mutation, Stopping condition for genetic algorithm flow, Genetic -neuro hybrid systems, Genetic-Fuzzy rule based system.

Text Books:

1. S. N. Sivanandam and S. N.Deepa, Principles of soft computing - Wiley India.
2. Timothy J. Ross, Fuzzy Logic with engineering applications – Wiley India.

References:

1. N. K. Sinha and M. M. Gupta, Soft Computing & Intelligent Systems: Theory & Applications-Academic Press /Elsevier. 2009.
2. Simon Haykin, Neural Network- A Comprehensive Foundation- Prentice Hall International, Inc.
3. R. Eberhart and Y. Shi, Computational Intelligence: Concepts to Implementation, Morgan Kaufman/Elsevier, 2007.
4. Ross T.J. , Fuzzy Logic with Engineering Applications- McGraw Hill.
5. Driankov D., Hellendoorn H. and Reinfrank M., An Introduction to Fuzzy Control- Narosa Pub.
6. Bart Kosko, Neural Network and Fuzzy Systems- Prentice Hall, Inc., Englewood Cliffs Goldberg D.E., Genetic Algorithms in Search, Optimization, and Machine Learning- Addison Wesley.

Web References:

1. https://onlinecourses.nptel.ac.in/noc21_cs11/preview
2. https://www.javatpoint.com/what-is-soft-computing
3. https://www.tutorialspoint.com/fuzzy_logic/index.htm
4. https://www.tutorialspoint.com/artificial_neural_network/index.htm

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
3	0	0	3

CLOUD COMPUTING

Internal Marks : 40

Course Code: P18CSE16 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

1. The cloud environment, building software systems and components that scale to millions of users in modern internet.
2. Cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and Virtualizations.
3. Developing cloud based software applications on top of cloud platforms.
4. Programming and Software Environments on different cloud platforms.
5. Understanding of cloud resource management scheduling algorithms and file systems.

Course Outcomes:

1. Apply the key dimensions of the challenge on Cloud Computing
2. Assessment of the economics, financial, and technological implications for selecting cloud computing for own organization
3. Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
4. Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas.
5. Accessing the data from different file systems on different cloud flat forms.

UNIT I: (9 Lectures)

Systems modeling, Clustering: Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency.

UNIT II: (8 Lectures)

Virtual Machines and Virtualization: Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices.

UNIT III: (10 Lectures)

Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT IV: (8 Lectures)

Cloud Programming and Software Environments: Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS- Simple Storage Service(S3) Architecture and Microsoft Azure, Emerging Cloud Software Environments.

UNIT V: (10 Lectures)

Cloud Resource Management and Scheduling and Storage Systems: Policies and Mechanisms for Resource Management, Two level Resource Allocation Architecture.
Scheduling Algorithms for Computing Clouds: Fair Queuing, Borrowed Virtual Time, Deadlines in cloud and map reduce scheduling.
Storage models: Distributed Vs parallel file systems: Google file system. Apache Hadoop, BigTable.

Text Books:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.\
3. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti,University

References:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH.

Web References:

1. https://pdfs.semanticscholar.org/0c79/1585b91e80320e9cbff9edefcdd834bd2791.pdf
2. http://www.ijircce.com/upload/2017/january/49_2_NEW.pdf
3. https://www.ripublication.com/irph/ijict_spl/ijictv4n1spl_07.pdf
4. http://aircconline.com/ijist/V6N2/6216ijist01.pdf
5. www.javatpoint.com

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
2	0	0	0

EMPLOYABILITY SKILLS

Course Code: P18MCT14 **Internal Marks: 100**

Course Prerequisites: Nil

Course Objectives:

1. To learn how to make effective teams, personality development and leadership skills.
2. To learn skills for discussing and resolving problems on the work site
3. To assess and improve personal grooming
4. To promote safety awareness including rules and procedures on the work site
5. To develop and practice self management skills for the work site

Course Outcomes:

1. To understand the corporate etiquette.
2. To understand and apply the decision making and problem solving skills.
3. To learn how to manage conflicts and stress.
4. To exhibit the leadership skills
5. To learn how to gain emotional Intelligence.

UNIT I: (6 Lectures)

Career Mapping: Inculcate workplace and professional etiquettes.
Tips for Success.
Etiquette and Manners – Social and Business
Time Management – Concept, Essentials, Tips.

UNIT II: (6 Lectures)

Personality Development – Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills.
Decision-Making and Problem-Solving Skills: Meaning, Types and Models, Group and Ethical Decision-Making, Problems and Dilemmas in application of these skills, Case studies and discussions etc.

UNIT III: (6 Lectures)

Conflict Management: Conflict - Definition, Nature, Types and Causes; Methods of Conflict Resolution.

Stress Management: Stress - Definition, Nature, Types, Symptoms and Causes; Stress Analysis Models and Impact of Stress; Measurement and Management of Stress.

UNIT IV: (6 Lectures)

Teamwork and Leadership Skills: Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Leadership and Assertiveness Skills: A Good Leader; Leaders and Managers; Leadership Theories; Types of Leaders; Leadership Behaviour; Assertiveness Skills.

UNIT V: (6 Lectures)

Emotional Intelligence: Meaning, History, Features, Components, Intrapersonal and Management Excellence; Strategies to enhance Emotional Intelligence.

References:

1. Wallace, Personality Development, India Edition, CENGAGE Learning, 2008.
2. P.Subba Rao ,Personnel and Human Resource Management , Himalaya Publishing House; Fifth Edition,2015
3. Ramachandran and Karthik, From campus to Corporate, India, PEARSON Publication, 2016.
4. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
5. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.
6. Raman, Meenakshi & Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

Related Activities:

1. Comparing company Work culture, Nature and Management styles - company information.
2. Handling personnel matters – eg Time management, Communication at work.
3. Role plays of chairing business meetings and negotiations.
4. Conflicts resolution Games
5. Team building and leadership skills Case studies and discussions
6. Find out the leadership styles of various companies CEO’s.
7. Tips for Enhancing Your Own Emotional Intelligence or Team

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

OOAD with UML LAB

Internal Marks : 40

Course Code: P18CSL10 **External Marks: 60**

Course Prerequisites: Java Programming

Course Objectives:

1. Construct UML diagrams for static view and dynamic view of the system.
2. Generate creational patterns by applicable patterns for given context.
3. Create refined model for given Scenario using structural patterns.
4. Construct behavioural patterns for given applications

Course Outcomes:

1. Understand the Case studies and design the Model.
2. Understand how design patterns solve design problems.
3. Develop design solutions using creational patterns.

List of Experiments:

Week 1: Familiarization with Rational Rose or Umbrella For each case study:

Week 2, 3 & 4:

For each case study:

a) Identify and analyze events
b) Identify Use cases
c) Develop event table
d) Identify & analyze domain classes
e) Represent use cases and a domain class diagram using Rational Rose
f) Develop CRUD matrix to represent relationships between use cases and problem domain classes

Week 5 & 6:

For each case study:

a) Develop Use case diagrams
b) Develop elaborate Use case descriptions & scenarios
c) Develop prototypes (without functionality)
d) Develop system sequence diagrams

Week 7, 8, 9 & 10:

For each case study:

a) Develop high-level sequence diagrams for each use case
b) Identify MVC classes / objects for each use case
c) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects
d) Develop detailed design class model (use GRASP patterns for responsibility assignment)
e) Develop three-layer package diagrams for each case study

Week 11 & 12:

For each case study:

a) Develop Use case Packages
b) Develop component diagrams
c) Identify relationships between use cases and represent them
d) Refine domain class model by showing all the associations among classes

Week 13 onwards:

For each case study:

- Develop sample diagrams for other UML diagrams
  State chart diagrams,
  Activity diagrams and
  Deployment diagrams.

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
1	0	2	2

MOBILE APPLICATION DEVELOPMENT LAB

Internal Marks : 40

Course Code: P18CSL12 **External Marks: 60**

Course Prerequisites: Java Programming

Course Objectives:

1. To learn about the concepts and principles of mobile computing;
2. To explore both theoretical and practical issues of mobile computing;
3. To develop skills of finding solutions and building software for mobile computing applications.

Course Outcomes:

1. Grasp the concepts and features of mobile computing technologies and applications;
2. Identify the important issues of developing mobile computing systems and applications
3. Organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities;
4. Develop mobile computing applications by using Wireless tool Kit and tools;
5. Organize and manage software built for Mobile Apps deployment.

List of Experiments:

1) Write a J2ME program to show how to change the font size and colour.
2) Write a J2ME program which creates the following kind of menu.
   *cut,*copy,*paste,*delete,*select all,*unselect all
3) Create a J2ME menu which has the following options(Event Handling)
   Cut - can be on/off, Copy - can be on/off, Paste - can be on/off
   Delete - can be on/off, Select all – put all 4 options on Unselect all – put all
4) Create a MIDP application, which draws a bar graph to the display. Data values can be given at int [] array. You can enter four data (integer) values to the input text field.
5) Create an MIDP application which examines, that a phone number, which a user has entered is in the given format (input checking):*Area code should be one of the following: 040, 041, 050, 0400 ,044*
6) Write a sample program to show how to make a SOCKET connection from J2ME phone. This J2ME sample program shows how to make a SOCKET connection from a

J2ME phone. Many a time there is a need to connect backend HTTP server from the J2ME application. show how to make a SOCKET connection from the phone to port 80.

7) This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server
This free J2ME sample program, shows how a J2ME application can do authentication to the backend server.

8) Web Application using J2ME The following should be carried out with respect to the given set of application domains:(Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

9) Write an Android application program that displays Hello World using Eclipse.

10) Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse

11) Write an Android application program that demonstrates the following:
(i) Linear Layout(ii) Relative Layout(iii) Table Layout(iv) Grid View layout

12) Write an Android application program that converts the temperature in Celsius to Fahrenheit.

13) Write an Android application program that demonstrates intent in mobile application development

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B.Tech IV Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

MEAN Stack LAB

Internal Marks : 40

Course Code: P18CSL11 **External Marks: 60**

Course Prerequisites: Java script

Course Objectives:

1. To learn about the concepts and principles of Angular and Node.js
2. To explore both theoretical and practical issues of Web Applications;
3. To develop skills of finding solutions and building Web Applications

Course Outcomes:

1. Knowledge on concepts and features of Angular ;
2. Identify the important issues of developing Web applications
3. Organize the functionalities and components of Angular and Node.js to develop projects
4. Develop Blockchain applications by using Java script;

List of Experiments:

1. Write a Angular JS Program to print your Details
2. Write a Angular JS program to binding data and perform Expressions using ng-bind
3. Write a Angular JS program using Angular JS Directives?
4. Write a Angular JS Program for creating Tables
5. Write a Angular JS Program for creating forms and perform the validation
6. Write a Node.js Program to create a HTTP server using HTTP Module
7. Write a Node.js Program to Perform operations on files
   a) Read files
   b) Create files
   c)Update files
   d)Delete files
   e)Rename files
8. Write a blockchain application in java script for the simple transaction
9. Write a blockchain application in java script to calculate hash code for the transaction

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

DESIGN PATTERNS

Internal Marks : 40

Course Code: P18CSE17 **External Marks: 60**

Course Prerequisites: OOAD

Course Objectives:

1. To understand design patterns and their underlying object oriented concepts.
2. To understand implementation of design patterns and providing solutions to real world software design problems.
3. To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

Course Outcomes:

1. Know the underlying object oriented principles of design patterns.
2. Understand the context in which the pattern can be applied.
3. Understand how the application of a pattern affects the system quality and its trade-offs
4. Understand the Behavioural and Structural patterns.
5. Know the Design pattern strategies.

UNIT I: (9 Lectures)

Introduction to Design Patterns Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalogue of Design Patterns, Organizing the Catalogue, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

UNIT II: (9 Lectures)

Designing A Document Editor: A Case Study Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation. Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT III: (10 Lectures)

Structural Patterns-1: Adapter, Bridge, Composite.

Structural Patterns-2: Decorator, Façade, Flyweight, Proxy, Discuss of Structural Patterns.

UNIT IV: (8 Lectures)

Behavioural Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.
Behavioural Patterns-2: Mediator, Memento, Observer.

UNIT V: (9 Lectures)

Behavioural Patterns-2(cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioural Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

Text Books:

1. Design Patterns By Erich Gamma, Pearson Education.

References:

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education. 6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons

Web References:

1. https://www.javatpoint.com/design-patterns-in-java
2. https://www.geeksforgeeks.org/software-design-patterns/
3. https://www.tutorialspoint.com/design_pattern/design_pattern_overview.html
4. https://www.oodesign.com/
5. http://ui-patterns.com/patterns

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

SOCIAL MEDIA ANALYTICS

Internal Marks : 40

Course Code: P18CSE18 **External Marks: 60**

Course Prerequisites: Nil

Course Objectives:

1. To understand the concept of semantic web and related applications.
2. To learn knowledge representation using ontology.
3. To understand human behaviour in social web and related communities.
4. To learn visualization of social networks.

Course Outcomes:

1. Develop semantic web related applications.
2. Represent knowledge using ontology.
3. Analyze Mining Communities in Web Social Networks
4. Predict human behaviour in social web and related communities.
5. Understand the Visualization and applications of social networks.

UNIT I: (9 Lectures)

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks.

UNIT II: (9 Lectures)

Modelling, Aggregating and Knowledge Representation: Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language – **Modelling and aggregating social network data**: State-of-the-art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships.

UNIT III: (10 Lectures)

Extraction and Mining Communities in Web Social Networks: Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms

– Tools for detecting communities social network infrastructures and communities – Decentralized online social networks.

UNIT IV: (8 Lectures)

Predicting Human Behaviour and Privacy Issues: Understanding and predicting human behaviour for social communities – User data management – Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness – Privacy in online social networks – Trust in online environment – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation.

UNIT V: (9 Lectures)

Visualization and Applications of Social Networks: Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node-Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare – Collaboration networks – Co-Citation networks.

Text Books:

1. Peter Mika, -Social Networks and the Semantic Web, First Edit ion, Springer 2007.
2. Borko Furht, -Handbook of Social Network Technologies and Applicat ions, 1st Edition, Springer, 2010.

References:

1. Guandong Xu, Yanchun Zhang and Lin Li, Web Mining and Social Networking – Techniques and applications, First Edition, Springer, 2011.
2. Dion Goh and Schubert Foo - Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively, IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling, IGI Global Snippet, 2009.
4. John G. Breslin, Alexander Passant and Stefan Decker, -The Social Semantic Web, Springer, 2009

Web References:

1. https://learnengineering.in/cs6010-social-network-analysis/
2. https://www.tutorialspoint.com/social_media_marketing/social_media_analysis.htm
3. https://csenotescorner.blogspot.com/2017/01/cs6010-social-network-analysis-syllabus.html
4. https://www.sagepub.com/sites/default/files/upm-binaries/35208_ Chapter1.pdf

B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

INTERNET OF THINGS

Internal Marks : 40

Course Code: P18CSE19 **External Marks: 60**

Course Prerequisites: Computer Networks

Course Objectives:

1. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
2. Formulate a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
3. Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
4. Design and carry out an empirical evaluation of different algorithms on problem formulation, and state the conclusions that the evaluation supports.

Course Outcomes:

1. Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
2. Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
3. Develop different M2M communication models
4. Compare and contrast the threat environment based on industry and/or device type.
5. Understand and Implement various IoT cloud based services..

UNIT I: (8 Lectures)

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs, Sources of the IoTs, M2M Communication, Examples of IoTs, Design Principles For Connected Devices.

UNIT II: (10 Lectures)

IoT DESIGN METHODOLOGY: Purpose & Requirements Specification, Process Specification, Domain Model Specification, Information Model Specification, Service Specification, IoT Level Specification, Functional View Specification, Operational View specification, Device & Component Integration and Application Development.

UNIT III: (11 Lectures)

PROTOTYPING EMBEDDED DEVICE WITH ARDUINO: Sensors, Actuators, Embedded Computing Basics- Micro Controllers, System on Chips, Choosing your Platform, Arduino – Developing on the Arduino.

PROTOTYPING EMBEDDED DEVICE WITH RASPBERRY PI: Raspberry PI – Introduction, cases and Extension Boards, Developing on the Raspberry PI.

UNIT IV: (8 Lectures)

Web Communication protocols for Connected Devices, Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM).

UNIT V: (8 Lectures)

DOMAIN SPECIFIC APPLICATIONS OF IoT: Home Automation, Agriculture Applications, Smart City applications.

Text Books:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015
3. Adrian McEwen & Hakim Cassimally, "Designing the Internet of Things", Wiley Publications – 2014..

References:

1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things CunoPfister , Oreilly
3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.
4. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
5. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice.

Web References:

1. https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT
2. https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
3. https://www2.deloitte.com/content/dam/insights/us/articles/iot-primer-iot-technologies-applications/DUP_1102_InsideTheInternetOfThings.pdf

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

GPU PROGRAMMING

Internal Marks : 40

Course Code: P18CSE20 **External Marks: 60**

Course Prerequisites:

Course Objectives:

1. To understand the basics of GPU architectures.
2. To write programs for massively parallel processors.
3. To understand the issues in mapping algorithms for GPUs.
4. To introduce different GPU programming models.

Course Outcomes:

1. Describe GPU Architecture.
2. Write programs using CUDA, identify issues and debug them.
3. Implement efficient algorithms in GPUs for common application kernels, such as matrix multiplication.
4. Write simple programs using OpenCL.
5. Identify efficient parallel programming patterns to solve problems.

UNIT I: (9 Lectures)

Introduction to CUDA: CUDA Terminology - Kernels, Threads, Blocks, Memory Management, Basic Matrix Multiplication using Parallel Programming, Built-in Variables and Functions, Thread Scheduling, CUDA Memory Model, Thread Synchronization, Matrix Multiplication Revisited.

UNIT II: (9 Lectures)

GPU Architecture Overview: Trends in CPU and GPU Performance, CPU Architecture Overview, CPU Parallelism, and Scheduling, History of GPUs, GPU Architecture Evolution**.**

UNIT III: (9 Lectures)

Parallel Algorithms: Reduction, Scan (Naive and Work-Efficient), Stream Compaction, Summed Area Tables, Radix Sort.

UNIT IV: (10 Lectures)

CUDA Performance: Parallel Reduction Revisited, Warp Partitioning, Memory Coalescing, Bank Conflicts, Dynamic Partitioning of SM Resources, Data Pre-fetching, Instruction Mix, Loop Unrolling, Thread Granularity.

UNIT V: (8 Lectures)

CUDA Atomics: Atomic Functions, Atomic Add, Subtract, Exchange, CAS

Text Books:

1. Shane Cook, CUDA Programming: A Developers Guide to Parallel Computing with GPUs (Applications of GPU Computing), First Edition, Morgan Kaufmann, 2012.
2. David R. Kaeli, Perhaad Mistry, Dana Schaa, Dong Ping Zhang, Heterogeneous computing with OpenCL, 3rd Edition, Morgan Kauffman, 2015.

References:

1. Nicholas Wilt, CUDA Handbook: A Comprehensive Guide to GPU Programming, Addison -Wesley, 2013.
2. Jason Sanders, Edward Kandrot, CUDA by Example: An Introduction to General Purpose GPU Programming^, Addison – Wesley, 2010.
3. David B. Kirk, Wen-mei W. Hwu, Programming Massively Parallel Processors – A Hands-on Approach, Third Edition, Morgan Kaufmann, 2016.

Web References:

1. http://www.nvidia.com/object/cuda_home_new.html
2. http://www.openCL.org

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

SERVICE ORIENTED ARCHITECTURE

Internal Marks : 40

Course Code: P18CSE21 **External Marks: 60**

Course Objectives:

- To learn fundamentals of XML.
- To provide an overview of Service Oriented Architecture and Web services and their importance.
- To learn web services standards and technologies.
- To learn service oriented analysis and design for developing SOA based applications.

Course Outcomes:

- Understand XML technologies
- Understand service orientation, benefits of SOA
- Understand web services and WS standards
- Use web services extensions to develop solutions
- Understand and apply service modeling, service oriented analysis and design for application development

UNIT-I: (9 Lectures)

XML: XML document structure – Well-formed and valid documents – DTD – XML Schema – Parsing XML using DOM, SAX – XPath – XML Transformation and XSL – Xquery.

UNIT-II: (9 Lectures)

SERVICE ORIENTED ARCHITECTURE (SOA) BASICS: Characteristics of SOA, Benefits of SOA , Comparing SOA with Client-Server and Distributed architectures — Principles of Service Orientation – Service layers.

UNIT-III: (9 Lectures)

WEB SERVICES (WS) AND STANDARDS: Web Services Platform – Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Service-Level Interaction Patterns – Orchestration and Choreography.

UNIT-IV: (9 Lectures)

WEB SERVICES EXTENSIONS: WS-Addressing – WS-ReliableMessaging – WS-Policy – WS-Coordination – WS -Transactions – WS-Security – Examples.

UNIT-V: (9 Lectures)

SERVICE ORIENTED ANALYSIS AND DESIGN: SOA delivery strategies – Service oriented analysis – Service Modelling – Service oriented design – Standards and composition guidelines — Service design – Business process design – Case Study

Text Books:

1. Thomas Erl, ― Service Oriented Architecture: Concepts, Technology, and Design, Pearson Education, 2005
2. Sandeep Chatterjee and James Webber, ―Developing Enterprise Web Services: An Architect's Guide, Prentice Hall, 2004

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References:

1. 1. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, ―Java Web Services Architecture, Elsevier, 2003.
2. Ron Schmelzer et al. ― XML and Web Services, Pearson Education, 2002.
3. Frank P.Coyle, ―XML, Web Services and the Data Revolution, Pearson Education, 2002

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

NATURAL LANGUAGE PROCESSING

Internal Marks : 40

Course Code: P18CSE22 **External Marks: 60**

Course Prerequisites: Artificial Intelligence, Machine Learning

Course Objectives:

1. Understand and apply fundamental algorithms and techniques in the area of natural language processing (NLP).
2. Understand approaches to syntax and semantics in NLP.
3. Understand current methods for statistical approaches to machine translation.
4. Understand language modeling.
5. Understand machine learning techniques used in NLP.

Course Outcomes:

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Ability to design, implement and analyze NLP algorithms.
3. To develop language modelling using NLP algorithms.
4. To write NLP algorithms to check syntax and semantics
5. To deploy a conversational agent using NLP.

UNIT I: (9 Lectures)

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing.

UNIT II: (9 Lectures)

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution.

UNIT III: (10 Lectures)

Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT IV: (8 Lectures)

Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT V: (9 Lectures)

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

Text Books:

1. Natural Language Understanding – James Allen, Second Edition, Pearson Education.

References:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
4. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2013-2014
5. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

1. https://onlinecourses.nptel.ac.in/noc19_cs56/preview
2. https://www.coursera.org/specializations/natural-language-processing
3. https://lecturenotes.in/subject/371/natural-language-processing-nlp
4. https://www.tutorialspoint.com/natural_language_processing/index.htm

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

Pattern Recognition

Internal Marks : 40

Course Code: P18CSE23 **External Marks: 60**

Course Prerequisites: Artificial Intelligence, Machine Learning

Course Objectives:

1. To enable the students to understand the fundamentals of Pattern recognition.
2. To make the students should learn to choose an appropriate feature, Pattern classification algorithm for a pattern recognition problem
3. To make the students properly implement the algorithm using modern computing tools such as Matlab, OpenCV, C, C++ and correctly.
4. To analyze, and report the results using proper technical terminology

Course Outcomes:

1. understand the fundamentals of pattern recognition and machine learning algorithms
2. design and implement certain important pattern recognition techniques
3. develop applications by using pattern recognition algorithms.
4. construct machine learning models for pattern recognition.
5. present the various patterns using mathematical models..

UNIT I: (9 Lectures)

Introduction to Pattern Recognition: Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition,Pattern Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature, Feature Selection.

UNIT II: (9 Lectures)

Nearest Neighbor Based Classifiers: Nearest Neighbor Algorithm, Variants of the NNAlgorithm, Use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection, Bayes Classifier: Bayes Theorem, Minimum error rate classifier, Estimation of Probabilities, Comparison with the NNC, Naive Bayes Classifier.

UNIT III: (10 Lectures)

Hidden Markov Models: Markov Models for Classification, Hidden Markov Models, Classification Using HMMs, Classification of Test Patterns. Decision Trees: Introduction, Decision Trees for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Over fitting and Pruning, Example of Decision Tree Induction.

UNIT IV: (8 Lectures)

Support Vector Machines: Introduction, Linear Discriminant Functions, Learning the Linear Discriminant Function, Neural Networks, SVM for Classification, Linearly Separable Case, Non- linearly Separable Case. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers, Evaluation of Classifiers, Evaluation of Clustering.

UNIT V: (9 Lectures)

Clustering: Clustering and its Importance, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets, An Application to Handwritten Digit Recognition: Description of the Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns.

Text Books:

1. Pattern Recognition an Introduction, V. Susheela Devi M. Narasimha Murty, University Press.
2. Pattern Recognition, Segrios Theodoridis,Konstantinos Koutroumbas, Fourth Edition, Elsevier..

References:

1. Pattern Recognition and Image Analysis, Earl Gose, Richard John Baugh, Steve Jost, PHI 2004.
2. C. M. Bishop, „Neural Networks for Pattern Recognition", Oxford University Press, Indian Edition, 2003.
3. Pattern Classification, R.O.Duda, P.E.Hart and D.G.Stork, Johy Wiley, 2002.

Web References:

1. https://en.wikipedia.org/wiki/Pattern_recognition#:~:text=Pattern%20recognition%20is%20the%20automated,computer%20graphics%20and%20machine%20learning.
2. https://www.geeksforgeeks.org/pattern-recognition-introduction/
3. https://www.youtube.com/watch?v=ZGUlaomeJ-k
4. https://link.springer.com/journal/11493
5. https://www.sciencedirect.com/journal/pattern-recognition
6. https://www.journals.elsevier.com/pattern-recognition/
7. https://www.coursera.org/learn/machine-learning/.../classification
8. https://www.youtube.com/watch?v=UzxYlbK2c7E

B.Tech IV Year -II Semester

Course structure

L	T	P	C
3	0	0	3

CYBER SECURITY

Course Code: P18CSE24

Internal Marks: 40
External Marks: 60

Course Prerequisite: Nil

Course Objectives:

1. The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
2. Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

Course Outcomes:

1. Cyber Security architecture principles
2. Identifying System and application security threats and vulnerabilities
3. Identifying different classes of attacks
4. Cyber Security incidents to apply appropriate response
5. Describing risk management processes and practices

UNIT-I: (9 Lectures)

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defence, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terror

Unit-II: (10 Lectures)

Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

Cybercrime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Laptops.

UNIT-III (8 Lectures)

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft.

UNIT-IV (8 Lectures)

Cybercrimes and Cyber security: Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies

UNIT-V (10 Lectures)

Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics,

Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Anti-forensics.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning
3. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018..

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.

Web References:

1. https://www.udemy.com/cyber-security/online-course
2. https://www.tutorialspoint.com/.../cyber_crime_and_cyber_security.htm
3. https://byjus.com/free-ias-prep/cyber-security
4. https://www.coursehero.com/file/97034432/cyber-security

B.Tech IV Year - II Semester

Course structure

L	T	P	C
3	0	0	3

HUMAN COMPUTER INTERACTION

Course Code: P18CSE25

Internal Marks: 40
External Marks: 60

Course Prerequisite: Knowledge of Computer and Its Architecture

Course Objectives:

1. To provide basic methodologies and processes for designing interfaces.
2. To improve the interaction between users and computers by making computers more usable and receptive to the user‘s needs.
3. To provide relevant principles of behaviour, mostly derived from cognitive science and psychology and other sources that describe human ethologic in particular environment, especially technological ones.
4. To make the students familiar with developing new interfaces and interaction techniques.

Course Outcomes:

1. Identify the elements of good user interface design through effective GUI.
2. Identify the importance of human characteristics and understanding business functions.
3. Analyze screen design principles for making good decisions based on technological considerations in interface design.
4. Select the window, device and screen based controls through navigation schemes.
5. Identify the basic components and interaction devices to interact with the computers.

UNIT-I: (9 Lectures)

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

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

Unit-II: (9 Lectures)

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT-III (10 Lectures)

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT-IV (8 Lectures)

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT-V (9 Lectures)

Components – text and messages, Icons and images – Multimedia, colour – uses, problems with choosing colours.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Text Books:

1. Wilbert O Galitz, ‖The Essential Guide to User Interface Design‖, Wiley DreamaTech, Third Edition, 2007.

Reference Books:

1. Ben Shneiderman,CatherinePlaisant,―Designing the User Interface‖,Fourth Edition, Pearson Education ,2008.
2. ALAN DIX, JANET FINLAY, GREGORYD. ABOWD, RUSSELL BEALE,―HumanComputer Interaction‖,Third Edition,PEARSON,2009.

Web References:

1. http://ps.fragnel.edu.in/~dipalis/prgdwnl/eguid.pdf
2. https://www.alljntuworld.in/download/human-computer-interaction-materials-notes/
3. http://www.crectirupati.com/sites/default/files/lecture_notes/HCI-notes.pdf

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B.Tech IV Year II Semester

Course Structure

L	T	P	C
3	0	0	3

GAME THEORY

Internal Marks : 40

Course Code: P18CSE26 **External Marks: 60**

Course Prerequisites: Probability Theory

Course Objectives:

1. **T**o introduce the basics of game theory to undergraduate students in various disciplines.
2. It focuses on fundamentals of game theory including basic concepts and techniques
3. various ways of describing and solving games, and various applications in economics, political sciences, and business.
4. It will help students sharpen their understanding of strategic behavior in different situations involving many individuals.
5. The students will learn how to recognize and model strategic situations, to predict when and how their action will have an influence on others, and to exploit strategic situations for the benefit of their own.

Course Outcomes:

1. Analyze games based on complete and incomplete information about the players
2. Analyze games where players cooperate
3. Compute Nash equilibrium
4. Apply game theory to model network traffic
5. Analyze auctions using game theory.

UNIT I: (10 Lectures)

What is Game Theory? Definition of Games. Actions, Strategies, Preferences, Payoffs. Examples. Strategic form games and examples: Prisoner's Dilemma, Bach or Stravinsky, Matching Pennies. Notion of Nash Equilibrium. Examples of Nash Equilibrium. Dominated Actions. Symmetric Games and Symmetric Equilibria. Case Studies of Nash Equilibrium in popular games.

UNIT II: (8 Lectures)

Mixed-Strategy Nash Equilibrium

Mixed Strategy Nash Equilibrium- Randomization of Actions, Mixed strategy Nash equilibrium, Dominated actions, Pure strategy equilibria in the presence of

randomization, Illustrations: (1)expert diagnosis (2) reporting a crime. Finding all mixed strategy Nash equilibria of some representative games.

UNIT III: (10 Lectures)

Two Player Zero sum Games (Matrix Games)- Max-minimization and Min maximization. Saddle points. Nash equilibrium in matrix games. Mini-max theorem, Solution via linear programming. Examples; Extensive games with Perfect Information- Extensive games, Strategies and outcomes, Nash equilibrium, Subgame perfect equilibrium, finding subgame perfect equilibria using backward induction. Allowing for simultaneous moves. Examples.

UNIT IV: (10 Lectures)

Bayesian and Repeated Games- Motivational Examples. Definition of a Bayesian Game and Bayesian Nash Equilibrium and examples. Auctions: Independent private values, Nash equilibrium of first price auction and second price auction, common valuations, revenue equivalence of auctions

UNIT V: (7 Lectures)

Mechanism Design: Strategic voting, unrestricted preferences, Implementation, quasi linear setting, Efficient mechanisms, Computational applications of mechanism design, Task scheduling, Bandwidth allocation in computer networks.

Text Books:

1. Martin Osborne," An Introduction to Game Theory",(International Ed.), Oxford University, Press,2009.
2. P.Morris,"Introduction to game theory",Springer,2013.
3. A. Dixit, S. Skeath and D. Reiley, Games of Strategy, 3rd edition, 2009 or 4th edition, 2015, W.W. Norton & Company: New York..

References:

1. Ken Binmore, "Fun and Games : A Text On Game Theory", D. C. Heath & Company, 2003.
2. Y. Narahari,"Essentials of Game Theory and Mechanism Design", IISc Press, 2014

Web References:

1. http://www.nitandhra.ac.in/main/B.Tech/CSE.pdf
2. https://www.coursera.org/learn/game-theory-1?ac
3. https://www.geeksforgeeks.org/game-theory
4. https://www.economics.utoronto.ca/osborne/igt/TOC.HTM

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B.Tech IV Year - II Semester

Course structure

L	T	P	C
2	0	0	2

ETHICS AND HUMAN VALUES

Course Code: P18MBT02

Internal Marks: 40
External Marks: 60

Course Objectives:

1. To introduce the students to the Human values and help them to lead a peaceful life in the society by contributing to peace and safety in the society.
2. To help the students to know about the history of ethics and importance of social experimentation
3. To specify the students about the importance of their responsibility towards safety and risk as Engineers.
4. To specify the students about the importance of their responsibility as Engineers.
5. To help the student explore the ethical values globally.

Course Outcomes:

1. To learn about the different Human values to be maintained by all the people.
2. To learn about the history of ethics and the importance of ethics for professionals and application of ethics in social experimentation.
3. To learn about the responsibilities of engineers for safety and risk.
4. To learn about the responsibilities and rights of engineers.
5. To learn about global work environment with respect to ethics.

UNIT I : Human Values **(5 Lectures)**

Human Values: Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT II : Engineering Ethics and Social Experimentation **(5 Lectures)**

Engineering Ethics: The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics - Consensus and Controversy –Professional and Professionalism – Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument –Heinz's Dilemma.

Engineering as Social Experimentation: Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT III : Engineers' Responsibility for Safety and Risk (5 Lectures)

Engineers' Responsibility for Safety and Risk: Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences- Expected Probability- Reversible Effects- Threshold Levels for Risk-Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – Risk Benefit Analysis-Accidents.

UNIT IV : Engineers' Responsibilities and Rights (5 Lectures)

Engineers' Responsibilities and Rights: Collegiality-Techniques for Achieving Collegiality –Two Senses of Loyalty - obligations of Loyalty-misguided Loyalty – professionalism and Loyalty - Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self interest, Customs and Religion- Ethical egoism-Collective bargaining Confidentiality-Acceptance of Bribes/Gifts-when is a Gift and a Bribe examples of Gifts v/s Bribes-problem solving-interests in other companies Occupational Crimes-industrial espionage-price fixing-endangering lives Whistle Blowing-types of whistle blowing-when should it be attempted preventing whistle blowing.

UNIT V : Global Issues (5 Lectures)

Global Issues: Globalization- Cross-culture Issues-Environmental Ethics-Computer Ethics computers as the instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous computers-computer codes of Ethics Weapons Development-Ethics and Research-Analysing Ethical Problems in Research-Intellectual Property Rights.

Text Books:

1. "Engineering Ethics and Human Values" by M.Govindarajan, S.Natarajan and V.S. Senthil Kumar-PHI Learning Pvt. Ltd-2009.
2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana-Maruthi Publications.
3. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M. Jayakumaran- Laxmi Publications.
4. "Professional Ethics and **Human Values" by Prof. D.R. Kiran.**

Reference Books:

1. **"**Indian Culture, Values and Professional Ethics" by PSR Murthy, BS Publication.
2. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003**.**
3. **"**Engineering **Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.**

Web References:

1. crescent.education/wp-content/.../12/Crescent-human-values-professional-ethics.pdf

2. https://www.crectirupati.com/.../HVPE-MBA-K%20YAMUNA-LECTURE%20NOTES
3. https://lecturenotes.in/subject/576/professional-ethics-and-human-values-pehv
4. https://nptel.ac.in/courses/109104068/30
5. https://onlinecourses.nptel.ac.in/noc18_mg25

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