

SR20
DEPARTMENT
OF
ARTIFICIAL INTELLIGENCE &
DATA SCIENCE
CODE-72
St. PETER'S ENGINEERING COLLEGE
HYDERABAD

I B.Tech., I-Sem.,									
Course Code	Course Title	Course Area	Hours/Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS02	ENGINEERING CHEMISTRY	BSC	3	1	0	3	30	70	100
AS20-02ES01	BASIC ELECTRICAL ENGINEERING	ESC	3	1	0	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	0	0	2	30	70	100
AS20-04ES01	ELECTRONIC DEVICES AND CIRCUITS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-04ES05	ELECTRONIC DEVICES AND CIRCUITS LAB	ESC	0	0	2	1	30	70	100
AS20-00HS02	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
AS20-00BS03	ENGINEERING CHEMISTRY LAB	BSC	0	0	2	1	30	70	100
VALUE ADDED COURSE									
AS20-00HS03	SOFT SKILLS-I	HSMC	2	0	0	0	25	75	100
TOTAL						17.5			
I B.Tech., II-Sem.,									
Course Code	Course Title	Course Area	Hours/Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS08	APPLIED PHYSICS	BSC	3	1	0	3	30	70	100
AS20-05ES01	PROGRAMMING FOR PROBLEM SOLVING	ESC	3	1	0	3	30	70	100
AS20-03ES02	ENGINEERING GRAPHICS AND DESIGN	ESC	2	0	3	3.5	30	70	100
AS20-00HS07	UNIVERSAL HUMAN VALUES-II	HSMC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS09	APPLIED PHYSICS LAB	BSC	0	0	3	1.5	30	70	100
AS20-05ES02	PROGRAMMING FOR PROBLEM SOLVING LAB	ESC	0	0	3	1.5	30	70	100
AS20-03ES04	ENGINEERING PRACTICES	ESC	0	0	4	2	30	70	100
VALUE ADDED COURSE									
AS20-00HS04	SOFT SKILLS -II	HSMC	2	0	0	0	25	75	100
TOTAL						20.5			

II B.Tech., I-Sem.,

Course Code	Course Title	Course Area	Hours/ Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72PC01	DATA STRUCTURES	PCC	3	1	0	3	30	70	100
AS20-05PC01	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	PCC	3	1	0	3	30	70	100
AS20-05PC06	OPERATING SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-72PC02	PRINCIPLES OF ARTIFICIAL INTELLIGENCE	PCC	3	1	0	3	30	70	100
AS20-00HS06	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	HSMC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-72PC03	DATA STRUCTURES LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC03	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC09	OPERATING SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC01	ENVIRONMENTAL SCIENCES	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-12PW01	IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI	PW	0	0	2	1	25	75	100
AS20-66PW01	ROBOTICS AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-72PW01	WEB BASED APPLICATIONS DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-12PW02	GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)	PW	0	0	2	1	25	75	100
AS20-05PW02	PROJECT BASED LEARNING USING C++	PW	0	0	2	1	25	75	100
TOTAL						20.5			

II B.Tech., II-Sem.,									
Course Code	Course Title	Course Area	Hours/ Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-00BS10	PROBABILITY AND RANDOM PROCESS	BSC	3	1	0	3	30	70	100
AS20-72PC04	DATABASE SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-12PC02	PROGRAMMING ESSENTIALS USING PYTHON	PCC	3	1	0	3	30	70	100
AS20-05PC02	MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE	PCC	3	1	0	3	30	70	100
AS20-04ES06	DIGITAL ELECTRONICS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-12PC04	PYTHON PROGRAMMING LAB	PCC	0	0	3	1.5	30	70	100
AS20-72PC05	DATABASE SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
AS20-04ES07	DIGITAL ELECTRONICS LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC02	GENDER SENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-05PW03	INNOVATIVE PROJECT DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-66PW03	VIRTUAL REALITY	PW	0	0	2	1	25	75	100
AS20-05PW04	ANDROID APP DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-04PW05	INTRODUCTION TO MATLAB AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-72PW02	PROJECT BASED LEARNING USING PYTHON	PW	0	0	2	1	25	75	100
TOTAL						20.5			

III B.Tech., I-Sem.,

Course Code	Course Title	Course Area	Hours/Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72PC06	Big Data Technologies	PCC	3	0	0	3	30	70	100
AS20-72PC07	Data Science & Visualization	PCC	3	0	0	3	30	70	100
AS20-72PC08	Mining Massive Datasets	PCC	3	0	0	3	30	70	100
AS20-72PE1X	Professional Elective -I	PEC	3	0	0	3	30	70	100
AS20-72OE1X	Open Elective Course-I	OEC	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-72PC09	Mining Massive Data SetsLab	PCC	0	0	3	1.5	30	70	100
AS20-72PC10	Data Science & Visualization lab	PCC	0	0	3	1.5	30	70	100
AS20-00HS05	Advanced English Communication SkillsLab	HSMC	1	0	2	1	30	70	100
MANDATORY COURSE									
AS20-00MC06	Cyber security	MCC	3	0	0	0	0	100	100
AS20-00MC03	Constitution of India	MCC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-00HS10	APPTITUDE SKILLS	HSMC	0	0	2	1	25	75	100
AS20-00HS11	START-UP MANAGEMENT	HSMC	0	0	2	1	25	75	100
AS20-00HS12	ERP TOOLS	HSMC	0	0	2	1	25	75	100
TOTAL						20.5			

Professional Elective-I

Course Code	Course Title	Course Area	Hours/ Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72PE11	Data Analytics	PE	3	1	0	3	30	70	100
AS20-72PE12	Business Intelligence	PE	3	1	0	3	30	70	100
AS20-72PE13	Computer Networks	PE	3	1	0	3	30	70	100
TOTAL						3			

Open Elective-I

Course Code	Course Title	Course Area	Hours/Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72OE11	MATLAB programmingfor engineers	OE	3	0	0	3	30	70	100
AS20-72OE12	Introduction to control systems	OE	3	0	0	3	30	70	100
AS20-72OE13	Optimization techniques	OE	3	0	0	3	30	70	100
TOTAL						3			

III B. Tech., II-Sem.,

Course Code	Course Title	Course Area	Hours/ Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72PC12	Natural Language Processing	PCC	3	1	0	3	30	70	100
AS20-72PC13	Machine Learning	PCC	3	1	0	3	30	70	100
AS20-72PC14	Applications of AI	PCC	3	1	0	3	30	70	100
AS20-72PE2X	Professional Elective Course II	PEC	3	1	0	3	30	70	100
AS20-72OE2X	Open Elective Course-II	OEC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-72PC15	Natural Language Processing Lab	PCC	0	0	3	1.5	30	70	100
AS20-72PC16	Machine Learning Lab	PCC	0	0	3	1.5	30	70	100
AS20-72PC17	Applications of AI Lab	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC07	Intellectual property rights	MCC	3	0	0	0	0	100	100
AS20-00MC04	Professional Ethics	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-74PW01	FUNDAMENTALS OF GRAPHIC DESIGN	PW	0	0	2	1	25	75	100
AS20-74PW02	DESIGN THINKING FOR INNOVATION	PW	0	0	2	1	25	75	100
AS20-72PW01	NATURAL LANGUAGE PROCESSING SPECIALIZATION	PW	0	0	2	1	25	75	100
AS20-12PW05	3D PRINTING DESIGN	PW	0	0	2	1	25	75	100
TOTAL						20.5			

Professional Elective-II

Course Code	Course Title	Course Area	Hours/ Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72PE21	Artificial Neural Network	PE	3	1	0	3	30	70	100
AS20-72PE22	Internet of Things	PE	3	1	0	3	30	70	100
AS20-72PE23	Computer Vision	PE	3	1	0	3	30	70	100
TOTAL						3			

Open Elective-II

Course Code	Course Title	Course Area	Hours/Week			Credit	Internal Marks	External Marks	Total Marks
			L	T	P				
AS20-72OE21	Environmental Economic	OE	3	0	0	3	30	70	100
AS20-72OE22	Introduction to robotics	OE	3	0	0	3	30	70	100
AS20-72OE23	Signal processing	OE	3	0	0	3	30	70	100
TOTAL						3			

**B.Tech.,
FIRST YEAR
FIRST SEMESTER
SYLLABUS**

LINEAR ALGEBRA AND ADVANCED CALCULUS
I B.Tech., I-Sem.,

Course Title: LINEAR ALGEBRA AND ADVANCED CALCULUS	Course Code: AS20-00BS06
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. Basic definitions of Matrices, 2. Knowledge of Calculus 3.Differentiation and Integration rules	

Course Overview: Course include

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Objective To learn

- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative. Finding maxima and minima of function of two and three variables

Course Outcomes:

CO#	Course Outcomes
C111.1	Convert the set of linear equations in to matrix notation and analyze its solution
C111.2	Apply the concept of orthogonal transformation and reduce quadratic form to canonical form
C111.3	Analyze the nature of series.
C111.4	Describe the applications of the mean value theorems
C111.5	Evaluate the improper integrals using Beta and Gamma functions.
C111.6	Categorize the extreme values of functions of two variables with constraints and without constraints.

COURSE CONTENT (SYLLABUS)

UNIT I: MATRICES

Matrices: Types of Matrices (only definitions); rank of a matrix by Echelon form and Normal form; Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations: solving system of Homogeneous and Non-Homogeneous equations- consistency, Gauss elimination method; Gauss Jacobi Iteration Method. Gauss Seidel Iteration Method.

UNIT-II: EIGEN VALUES AND EIGEN VECTORS

Eigen values and Eigenvectors and their properties; Cayley-Hamilton Theorem (without proof): finding inverse and power of a matrix by Cayley-Hamilton Theorem; Diagonalization; Quadratic forms and

Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: SEQUENCES & SERIES

Sequence: Definition of a Sequence, Convergence of a sequence (definitions and examples only).

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert's ratio test; Raabe's test; logarithmic test; Integral test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: SINGLE VARIABLE CALCULUS

Mean value theorems (all the theorems without proof): Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: MULTIVARIABLE CALCULUS

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables with constraints; without constraints; method of Lagrange's Multipliers.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd.,5th Edition,2016

References Books:

1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.khanacademy.org/math/linear-algebra>
2. https://onlinecourses.nptel.ac.in/noc20_ma27
3. <https://www.mooc-list.com/course/calculus-two-sequences-and-series-coursera>

Web Reference/E-Books:

1. www.ee.ic.ac.uk
2. <http://en.m.wikipedia.org>
3. www.math.odu.edu

ENGINEERING CHEMISTRY
I B.Tech., I SEM

Course Title: Engineering Chemistry	Course Code: AS20-00BS02
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Students must have studied two years of intermediate chemistry	

Course Overview:

The primary objective of an Engineering Chemistry course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. This course aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Molecular Orbital Concepts, Electrode Potential, Electrodes, types of batteries and their industrial applications, Fuels, UV-VIS, IR and NMR concepts.

Course Objective

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To know the modern technology and interpret different problems involved in industrial utilization of water.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of Electrochemistry and Corrosion which are essential for engineers in Industry.
- Ability to impart the knowledge of fuels to apply the role of chemistry in energy production.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course Outcomes (s)

CO#	Course Outcomes
C112.1	Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems.
C112.2	To know the modern technology and interpret different problems involved in industrial utilization of water.
C112.3	Interpret the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
C112.4	Summarize the principles and concepts of electrochemistry, corrosion to predict the behavior of a system under different variables.
C112.5	Define and classify the fuels, distinguishing the quality of fuels based on calorific values as well as understand the concepts of petroleum refining.
C112.6	Apply the concepts on basic spectroscopy and application to medical and other fields.

COURSE CONTENT (SYLLABUS)

Unit - I:

Water and its Treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems on Hardness of Water – Estimation of hardness of water by complexometric method. Boiler troubles: Scales and Sludge's and its treatment. Potable water and its specifications - Steps involved in treatment of Potable water – Disinfection of water by ozonization and chlorination – Breakpoint of Chlorination. Boiler feed water and its treatment – Internal Treatment of water: Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange Process. Desalination of Brackish water – Reverse Osmosis.

Unit – II:

Molecular Structure and Theories of Bonding: Introduction - Atomic and Molecular Orbital's. Linear Combination of Atomic Orbital's (LCAO), Molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of N₂, O₂ and F₂ molecules. π -molecular orbital's of butadiene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbital's in Tetrahedral, Octahedral and Square planar geometries. Band Structure of solids and effect of doping on conductance.

Unit - III:

Electrochemistry and Corrosion: Electro chemical cells – electrode potential, standard electrode potential, Nernst equation, Types of electrodes – Calomel, Quinhydrone and Glass electrode. Determination of P^H of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Batteries – Primary: Lithium cell, secondary batteries: Lead – Acid storage battery and Lithium ion battery.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, Differential Aeration Corrosion - water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods - Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing , Tinning, Metal Cladding.

Unit - IV:

Fuels and Combustion: Introduction-Classification of Fuels – Calorific value, Characteristics of a good fuel - Solid fuels: coal –Classification of a coal by Rank – Analysis of coal – Proximate and Ultimate analysis and their significance. Liquid fuels – Petroleum and its refining, Cracking –types – Fixed bed Catalytic Cracking - Moving bed catalytic cracking. Synthetic Petrol – Fischer-Tropsch's process- Knocking – Octane and Cetane rating, Flash Point, Fire point, Cloud point & Pour Point; Gaseous fuels – Composition and uses of Natural Gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

Unit-V

Spectroscopic Techniques and applications: Introduction, Principles of Electronic Spectroscopy: Beer-Lamberts law, Types of electronic transitions, applications of UV–Visible spectroscopy.

IR Spectroscopy: Introduction, Principle, Modes of Molecular vibrations, selection rules, Force Constant, Wave number regions of Some common organic functional groups (C-H, NH₂, OH, -COOH, C=O, C≡N, C=C, C≡C-O-C), Applications of IR Spectroscopy.

¹H-NMR Spectroscopy, Principles of NMR spectroscopy, Chemical shift - Shielding and Deshielding effects, Chemical shifts of some organic protons, Interpretation of NMR Spectra (Alkanes, Alcohol, carbonyl compounds, Alkyl halides) Applications of NMR: Introduction to Magnetic Resonance Imaging.

Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. R.V. Gadag & A. Nityananda Shetty., “Engineering Chemistry”, I K International Publishing House Private Ltd. New Delhi (2015- Edition).

References Books:

1. O.G. Palanna, “Engineering Chemistry”, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).
2. “Wiley Engineering Chemistry”, Wiley India Pvt. Ltd. New Delhi. Second Edition 2013.
3. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015- Edition).
4. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/105/104/105104102/>
2. <https://nptel.ac.in/courses/105/106/105106119/>
3. <https://nptel.ac.in/courses/103/103/103103163/>
4. <https://nptel.ac.in/courses/104/106/104106096/>
5. <https://nptel.ac.in/courses/115/102/115102025/>
6. <https://nptel.ac.in/courses/103/108/103108162/>
7. <https://nptel.ac.in/courses/103/105/103105110/>
8. <https://nptel.ac.in/courses/104/102/104102113/>

Web Reference/E-Books:

S.No	Advanced concepts in syllabus	Website Referred
1	Water & Its Treatment	https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/
2	Lithium Ion Batteries	https://www.youtube.com/watch?v=fo3DMXwD9ig
3	Fuel Cells	https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf
4	IR Spectroscopy	www.chem.ucalgary.ca
5	stereochemistry	research.cm.utexas.edu
6	Synthesis of Aspirin	http://vlab.amrita.edu/?sub=2&brch=191&sim=849&cnt=1
7	Defluoridation of fluoride water	www.csir.res.in
8	Engineering Chemistry IIT-MUMBAI	http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm
9	NMR Spectroscopy	https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy

BASIC ELECTRICAL ENGINEERING

I B.Tech., I SEM

Course Title: Basic Electrical Engineering	Course Code: AS20-02ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of Physics and Mathematics	

Course Overview:

Electrical engineering principles are taught in this course. Topics include circuit theory, alternating current theory, DC Machines, induction, motors, Synchronous Machine, cabling, batteries and Switches.

Course Objective

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To impart the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

Course Outcomes(s)

CO#	Course Outcomes
C113.1	Understand the basic concepts of Electrical Circuits.
C113.2	Study various concepts in AC circuits
C113.3	Discuss the concepts of transformer and Induction motor.
C113.4	Discuss the concepts of DC Machines and synchronous machines.
C113.5	Describe the operation of different types of cables, wires and batteries.
C113.6	understand the Performance of different protecting equipment's like MCB, FUSE.

COURSE CONTENT (SYLLABUS)

UNIT-I: D.C. CIRCUITS

Electrical circuit elements R, L and C, voltage and current sources, Kirchoff's laws, Network reduction techniques, Series –parallel, Y- Δ transformation, analysis of simple circuits with dc excitation. Superposition theorem, Thevenin's theorem and Norton's Theorem.

UNIT-II: A.C. CIRCUITS

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

UNIT-III: TRANSFORMERS AND INDUCTION MOTORS

Transformers: Principle of operation of transformer, Equivalent circuit, losses and efficiency, voltage regulation. Auto-transformer. Three phase transformer connections.

Induction motors: Working principle and operation of three phase induction motor, Losses and efficiency-Brake test. Single-phase induction motor-working principle, operation and applications.

UNIT-IV: DC MACHINES AND SYNCHRONOUS MACHINES

DC machines: Constructional details and working of DC Generator, Methods of excitation, Applications of DC generators. DC Motor - principle of operation, speed control of separately excited DC motor.

Applications of DC motors.

Synchronous machines: Construction and working of synchronous generator and its applications.

UNIT-V: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

Text Books:

1. “Basic Electrical Engineering”, D.C. Kulshreshtha, McGraw Hill, 2019.
2. “Basic Electrical Engineering”, A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
3. “Basic Electrical Engineering” - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
4. “Principle of Electrical Engineering”, V.K Mehta, R. Mehta, S. Chand Limited, 2011.
5. “Basic Electrical Engineering”, V. Mittle & Arvind Mittal, TMH, Second Edition.

References Books:

1. L.S. Bobrow, Fundamentals of Electrical Engineering”, Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. NPTEL Videos on Course “Basic Electrical Technology” Co-ordinated by IISc Bangalore
2. Link: <https://nptel.ac.in/courses/108/108/108108076/>
3. NPTEL Videos on Course “Basic Electrical Technology” Co-ordinated by IIT Kharagpur
Link: <https://nptel.ac.in/courses/108/105/108105053/>

Web Reference/E-Books:

- 1) Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009
Link: https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
- 2) Basic Electrical Engineering By Chakrabarti · 2009
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
- 3) Basic Electrical Engineering By R. K. Rajput · 2009
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
- 4) Basic Electrical Engineering By SK Sahdev · 2015
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover

ENGLISH
I B.Tech., I SEM

Course Title: English	Course Code: AS20-00HS01
Teaching Scheme (L:T:P): 2:0:0	Credits:2
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites:	
<ol style="list-style-type: none"> 1. Basic knowledge of English language 2. Must obtain Grammar, and basic reading skills 3. Able to communicate in English language with basic writing skills 4. Able to use different types of vocabulary in different types of situations 	

Course Overview:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objective: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Train the students to use language appropriately for Interviews, Group discussions and Public speaking
- Enhance and empower the students in communication skills by concentrating on LSRW skills.

Course Outcomes(s)

CO#	Course Outcomes
C114.1	Apply English language effectively in spoken and written forms
C114.2	Analyze the given texts and respond appropriately
C114.3	Apply various grammatical structures in personal and academic fronts.
C114.4	Develop appropriate vocabulary for professional communication
C114.5	Improve competency in various forms of academic and professional writing.
C114.6	Perceive the importance of language skill for the enhancement of employability opportunities.

COURSE CONTENT (SYLLABUS)

UNIT I:

‘Of Parents and Children’ from the Essays of Francis Bacon

Vocabulary: The Concept of Word Formation –The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT II:

'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: Homonyms, Homophones and Homographs

Grammar: Misplaced Modifiers

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Format of a Formal Letter- Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT III:

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

UNIT IV:

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations and Acronyms in English

Grammar: Sequence of Tenses

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Information Transfer- Flow Chart- Pie Chart– Essay Writing- Précis Writing.

UNIT V:

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Collocations, Commonly Confused Words- Common Errors in English

Reading: Reading Comprehension- Exercises for Practice

Writing: Technical Reports- Introduction - Structure of Reports- Types of Reports - Manuscript Format.

Text Books:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. The Essays of Frances Bacon, Edited, with introduction and notes by Mary Augusta Scott. Charles Scribner's Sons, New York, 1908,

References Books:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I – III. CIEFL, Hyderabad. Oxford University Press.
7. English Grammar Usage for Technical Students. DPS Publications, G Victor Emmanuel Raju, G Shailaja Reddy and M Sanjay Saahul.

1. Practice English Your Own-

<https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf>

2. Longman English Grammar Practice-

[file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Editio%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Editio%20(learnenglishteam.com).pdf)

3. English Grammar through stories by Alan Townend-

[file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf)

ELECTRONIC DEVICES AND CIRCUITS
I B.TECH., I SEMESTER

Course Title: Electronic Devices and Circuits	Course Code: AS20-04ES01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48Hrs+ 16Hrs
Continuous Internal Evaluation:30 Marks	Semester End Exam:70 Marks
Prerequisites: Basic knowledge of physics	

COURSE OVERVIEW

The creation of electronic circuits requires knowledge of the physics and device technology for the emission and flow control of electrons in vacuum and matter. It uses active devices to control electron flow by amplification and rectification. Electronics has had a major effect on the development of modern society.

COURSE OBJECTIVES

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To know the switching characteristics of components
- To know the need of biasing in Transistors
- To understand of various types of transistor's with its principle of operation

COURSE OUTCOMES

CO#	Course Outcomes
C115.1	Understand and analyze the characteristics of various components of semiconductor devices and its applications
C115.2	Understand and remember the applications of semiconductor diodes with examples.
C115.3	Analyze different types of transistor configurations with its parameters
C115.4	Understand and Analyze the relation between current amplification factors of the three configurations
C115.5	Analyze different biasing techniques of three terminal semiconductor Bipolar Semiconductor devices.
C115.6	Understand and remember the operation of different types of FET's with its characteristics.

COURSE CONTENT (SYLLABUS)

UNIT I

JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES

Diode and its characteristics, Static and Dynamic resistances, Diode current equation, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Zener diode and its characteristics ,Breakdown Mechanisms in Semi-Conductor (Avalanche and Zener breakdown) Diodes, Varactor Diode, LED, LCD and photo diode characteristics.

UNIT II

DIODE APPLICATIONS

Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor filter, L- section filter, Pi- section filter and comparison of various filter circuits, Clipping Circuits, Clamper circuits, Application of a Zener diode as a voltage regulator. Applications of LED and LCD's. Hall Effect and its applications.

UNIT III

BIPOLAR JUNCTION TRANSISTOR

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Volt-ampere characteristics of CB, CE and CC. Transistor current components, Transistor as a switch, switching times. BJT acts as an amplifier, Input and Output characteristics of transistor in Common

Base, Common Emitter, and Common collector configurations, Relation between Alpha, Beta and Gamma, Comparison of CE,CB,CC configurations.

UNIT IV

BIASING AND STABILISATION

Transistor Biasing and Stabilization - criteria for fixing operating point, DC & AC load lines, Need for Biasing –Types of biasing's-Fixed Bias, collector to base bias, Self-Bias and voltage divider bias techniques for stabilization, Stabilization factors, (S , S' , S''), Compensation techniques, (Compensation against variation in V_{BE} , I_{co} , β) Thermal run away, Thermal stability, Bias Stability, Bias Compensation using Diodes and thermistors.

UNIT V

FIELD EFFECT TRANSISTORS

Types-The Junction Field Effect Transistor (construction, principle of operation, symbol)- pinch -off Voltage -Volt -Ampere characteristics, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion modes.

TEXT BOOKS

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

REFERENCE BOOKS

1. The Art of Electronics, Horowitz, 3rd Edition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, McGraw Hill.

ONLINE RESOURCES

1. <https://nptel.ac.in/courses/115/102/115102014/>
2. <https://nptel.ac.in/courses/117/101/117101106/>
3. <https://www.coursera.org/learn/electronics>
4. https://onlinecourses.nptel.ac.in/noc20_ee77/preview
5. <https://www.classcentral.com/course/swayam-semiconductor-devices-and-circuits-19997>
6. <https://sggs.ac.in/wp-content/uploads/2020/08/SWAYAM-NPTEL-Equivalence-Courses-w.e.f.2020-21-Electronics.pdf>

E-BOOKS

1. <https://www.pdfdrive.com/basic-electronics-for-scientists-and-engineers-e28939124.html>

ELECTRONIC DEVICES & CIRCUITS LAB
I B.Tech., I SEM

Course Title: ELECTRONIC DEVICES & CIRCUITS LAB	Course Code: AS20-04ES05
Teaching Scheme (L:T:P):0:0:2	Credits:1
Type of Course: PRACTICALS	Total Contact Periods:48 hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Physics	

Course Overview: In This Practical Sessions Students can able to know, how to conduct Experiments by using breadboards and connections on it with different components, and make use of input and output peripherals, and measuring parameters on that equipment. Different semiconductor devices and its characteristics they should understand and analyze through that they can identify the applications of those devices, which may help them to develop prototype model of mini and major projects.

Course Objective:

- To know the applications of Semiconductor devices through their characteristics
- To determine characteristics of JFET.
- To understand the amplifying action of a transistor.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Course Outcomes(s)

CO NO:	Student will be able to
C116.1	Understand the modifications in its characteristics of two terminal semiconductor devices
C116.2	Understand the analyse specific application of Zener diode through its characteristics.
C116.3	Understand the application of diode as a rectifier
C116.4	Understand and apply different configurations of transistors (BJT, FETs) pertaining to its nature of characteristics.
C116.5	Analyse and evaluate h-parameters of Bipolar Junction Transistor and its importance.
C116.6	Understand and Evaluate the amplifying action of a transistor

LIST OF EXPERIMENTS

(TWELVE EXPERIMENTS TO BE DONE):

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. V-I Characteristics of LED
3. Photo Diode characteristics
4. Zener diode characteristics
5. Zener Diode acts as a voltage Regulator
6. Full Wave Rectifier with & without filters
7. Input and output characteristics of BJT in CE Configuration
8. Drain and Transfer characteristics of JFET in CS Configuration
9. Drain and Transfer characteristics of MOSFET in CS Configuration
10. Measurement of h-parameters from its CE and CB configurations
11. Verification of Amplifier action of a Transistor
12. Switching characteristics of a transistor

EXTRA EXPERIMENTS:

1. Half wave rectifier with and without filter
2. Input and output characteristics of BJT in CB Configuration
3. Input and output characteristics of BJT in CC Configuration

TEXT BOOKS:

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

REFERENCE BOOKS:

1. The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, Mc Graw Hill.
4. Electronic Devices and Circuits-by J.B.Guptha.

Web Reference/E-Books:

W1	https://www.electronics-tutorials.ws/amplifier/amplifier-classes.html
W2	https://www.seas.upenn.edu/~ese319/Lecture_Notes/Lec_10_HF_Model_10.pdf
W3	https://whatis.techtarget.com/definition/MOSFET-metal-oxide-semiconductor-field-effect-transistor
W4	https://www.daenotes.com/electronics/digital-electronics/oscillators
W5	https://www.tutorialspoint.com/amplifiers/classification_of_power_amplifiers.htm

VIDEO REFERNCES

V1	https://www.youtube.com/watch?v=NESchIntkR8
V2	https://www.youtube.com/watch?v=yUEss0Dl6ww&t=580s
V3	https://www.youtube.com/watch?v=4_nGFY7zgDM
V4	https://www.youtube.com/watch?v=NMZUevvwMlw
V5	https://www.youtube.com/watch?v=gRcE2t_28co

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
I B.Tech., I SEM

Course Title: English Language Communication Skills Lab	Course Code: AS20-00HS02
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course : Practical	Total Contact Periods: 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: 1. The students should have a basic knowledge of English language 2. Must obtain Grammar, and basic Speaking skills 3. Should able to communicate in English language 4. Able to use different types of vocabulary in different of situations	

Course Overview:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English Language Communication Skills Lab has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In ELCS Lab the focus should be on the skills development in the areas of vocabulary, grammar, reading and speaking. For this, the teachers should use the prescribed Lab manual for detailed study. The students should be encouraged in improving communication skills in the lab. The time should be utilized for activity based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objective: The course will help to

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To train students to use language appropriately for public speaking and interviews
- To improve the fluency of students in spoken English and neutralize their mother tongue influence

CO#	Course Outcomes
C117.1	Learn how to pronounce words using phonetic transcription
C117.2	Improves collaborative skills and maximizes speaking skills
C117.3	Develops Neutralization of accent for intelligibility
C117.4	Develops better understanding of nuances of English language through audio-visual experience
C117.5	Improves language skills according in the different situations, discussions and interviews
C117.6	Develops linguistic, communicative and critical thinking

COURSE CONTENT (SYLLABUS)

Listening Skills Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

Exercise – I : CALL Lab: Introduction to Pronunciation – Speech Sounds – Vowels and Consonants.

- ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language
- Practice: Greetings – Introducing Oneself and Others -Taking Leave – JAM Session- Situational Dialogues.

Exercise – II : CALL Lab: Understand: Structure of Syllables – Word Stress .

- Practice: Basic Rules of Word Accent.
- **ICS Lab:** Understand: Features of Good Conversation – Non- verbal Communication.
- Practice: Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions – Telephone Etiquette.

Exercise – III CALL Lab: Understand: Intonation- Rhythm-The Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

- **ICS Lab:** Oral Presentations- Introduction to Formal Presentations
- Practice: Formal Presentations- Poster Presentations and PPT's.

Exercise – IV

CALL Lab: Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

- **ICS Lab:** Public Speaking – Exposure to Structured Talks- Group Discussion
- Practice: Group Discussion.

Exercise – V

CALL Lab: Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

- ICS Lab: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews.

Practice: Mock Interviews

References

1. ELCS LAB MANUAL

2. Practice English Your Own-

<https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf>

3. Longman English Grammar Practice-

[file:///C:/Users/user/Downloads/Longman English Grammar Practice intermediate Self Study Edition% 20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/Longman%20English%20Grammar%20Practice%20intermediate%20Self%20Study%20Edition%20(learnenglishteam.com).pdf)

4. English Grammar through stories by Alan Townend-

[file:///C:/Users/user/Downloads/English-Grammar-Through-Stories% 20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf)

ENGINEERING CHEMISTRY LAB
I B.Tech., I SEM

Course Title: Engineering Chemistry Lab	Course Code: AS20-00BS03
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of chemistry	

Course Overview:

The course emphasizes active resolution of experimental problems involving volumetric, analytical and instrumental usage; their design and optimization. Analytical, oral presentation, written report, and cooperative problem-solving skills are stressed in the context of chemical sciences practices. Safety awareness is integrated throughout the course.

COURSE OBJECTIVES:

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes (s)

CO#	Course Outcomes
C118.1	Analyze the need, design and perform a set of experiments.
C118.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C118.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C118.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conductometric Measurements, Ostwald's viscometer and stalagmometer.
C118.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C118.6	Learn safety rules in the practice of laboratory investigations.

COURSE CONTENT (syllabus)

1. Determination of total hardness of water by Complexometric method using EDTA
2. Estimation of Iron using Standard KMnO_4 .
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Dichrometry
7. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate
8. Determination of acid value of coconut oil
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid using Stalagmometer
11. Synthesis of Aspirin and Paracetamol
12. Thin layer chromatography calculation of R_f values. eg ortho and para nitro phenols

Reference Books:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5TH edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html
2. <http://vlabs.iitb.ac.in/vlab/labscs.html>
3. <https://www.vlab.co.in/broad-area-chemical-engineering>

SOFT SKILLS 1
I B.Tech., I SEM

Course Title: Soft Skills 1	Course Code: AS20-00HS03
Teaching Scheme (L:T:P): 2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods:32 Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

Course Overview:

The students will enhance their communication skills. The course will enable them to become responsible towards their lives and will be able to face challenges, the course will also enable to develop work culture, orientation and will enable them with problem solving abilities.

Course Objective:-

1. To develop Communicative Methodology.
2. To lead the life with utmost responsibility.
3. To accept challenges.
4. To develop work orientation in the mindset of the students.
5. To have problem solving ability.

Course Outcomes(s)

CO#	Course Outcomes
C119.1	Facilitates better interaction among students.
C119.2	Enhance and improve documentation.
C119.3	Demonstrate leadership qualities.
C119.4	Demonstrate effective presentation skills.
C119.5	Express benevolence.
C119.6	Enhance their communication skills

COURSE CONTENT (SYLLABUS)

UNIT I: Importance of Soft Skills

Successful Career - Communication - Body Language - Written Communication - Presentation Team Work - Professionalism - Interpersonal Skills - Time and Stress Management - Leadership Qualities

UNIT II: Self Introduction

Introductory Speech - General Speech - Academic Speech - Evaluation of Speech - Steps of Self Introduction - Basic Questions and Answers - Deliver Self Introduction - Tips of Self Introduction - Body Gestures- Good Eye Contact - Never be Nervous - Do's and Don'ts' of Self Introduction- Examples on Self Introduction

UNIT III: Body Language

Introduction – Communicating Body – Studying of body language – 17 concepts of learning body language.

UNIT IV: Communication Skills

Sounds of English – English as a World Language – Speech formation – Pronunciation – Oral

Communication – Written Communication – Face to Face Communication Effective Communication – Presentation – Information Transfer.

UNIT V: Positive Attitude and Positive Thinking

Introduction – Possible Reactions – Dual Attitude – Indifference Attitude – Negative Attitude – Think Positively – Depend on Positive Thinking – Know – What we are – Benefits of Behaviour – Myths of negative thinking – Tips to become a positive thinker – Moving towards success

Text Books:

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips <https://www.youtube.com/watch?v=VczVqHJW0gg>
2. Effective Communication Skills Training Video in Hindi <https://www.youtube.com/watch?v=kxAXOh5RmwU>
3. A guide to effective communication <https://www.youtube.com/watch?v=JwjAAgGi-90>
4. A Failure to Communicate <https://www.youtube.com/watch?v=8Ox5LhIJSBE>
5. Non Verbal Communication <https://www.youtube.com/watch?v=SKhsavlvuao>

**B.Tech.,
FIRST YEAR
SECOND SEMESTER
SYLLABUS**

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
I B.Tech., - II SEM

Course Title: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	Course Code: AS20-00BS01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. knowledge on Derivatives 2. knowledge on Integrations 3. knowledge on Functions	

Course Overview:

- Students will be able to identify Exact and Non-Exact D.E. and find the solutions by using different methods.
- Students will be able to identify Homogeneous and Non-Homogeneous D.E. and find the solutions by using different methods.
- Students will learn and evaluate Double and Triple Integrals.
- Students will learn Gradient, Divergent, Curl and Vector Identities.
- Students will learn and evaluate Line, Surface and Volume Integrals and Vector Integral Theorems.

Course Objective:

- Methods of solving the differential equations of first order.
- Methods of solving the differential equations of higher order.
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes(s)

CO#	Course Outcomes
C121.1	Acquires various skills pertaining to differential and vector calculus and apply them in different fields of Engineering
C121.2	Determine whether the given differential equation of first order is exact or not.
C121.3	Apply the concept of higher order ODE to real world problems.
C121.4	Analyze and apply the concept of multiple integrals to find areas, volumes.
C121.5	Define Directional Derivative and Scalar Potential Function
C121.6	Evaluate the line, surface and volume integrals and convert them from one to another.

COURSE CONTENT (SYLLABUS)

UNIT I: FIRST ORDER ODE

Exact equations; Non-Exact equations; Linear equations; Bernoulli's equations; Newton's Law of Cooling; Law of Natural Growth and Decay; Orthogonal Trajectories.

UNIT II: HIGHER ORDER LDE

Higher Order Linear Differential Equations with Constant Coefficients; Non-Homogeneous Differential Equations with RHS of the type: e^{ax} , $\sin ax$, $\cos ax$, x^k , $e^{ax}v$, xv , Method of Variation of Parameters.

UNIT III: MULTIPLE INTEGRALS

Evaluation of Double Integrals (Cartesian and Polar); Change of Variables (Cartesian to Polar); Change of Order of Integration (Cartesian form); Areas and Volumes by Double Integrals. Triple Integrals (Cartesian form).

UNIT IV: VECTOR DIFFERENTIATION

Vector Point Function; Scalar Point function; Gradient; Divergent; Solenoidal; Curl; Irrotational; Directional Derivative; Scalar Potential Function; Vector Identities.

UNIT V: VECTOR INTEGRATION

Line Integral; Surface Integral; Volume Integral; Green's Theorem in a plane; Gauss's Divergence Theorem; Stoke's Theorem (without proofs) and Applications.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2010.
2. S.R.K. Iyengar and R.K. Jain, Advanced Engineering Mathematics, Narosa Publishing House, 5th Edition, 2016.

References Books:

1. Dr. M.D. Rai Singhania, Ordinary and Partial Differential Equations, S.Chand and Company Ltd., 18th Edition, 2008.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3. Murray R. Spiegel, Seymour Lipschutz, Dennis Spellman, Vector Analysis: Schaum's Outlines Series, Tata McGrawHill, 2nd Edition, 2009.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

<https://www.coursera.org/learn/ordinary-differential-equations>

2. https://onlinecourses.nptel.ac.in/noc20_ma15/preview

Web Reference/E-Books:

1. Engineering Mathematics-II By Dr.M.Suryanarayana Reddy
2. Mathematics-I By P. Shivaramakrishna Das, C. Vijaya Kumari
3. Ordinary And Partial Differential Equations By Dr.M.D.Raisinghania

APPLIED PHYSICS
I B.Tech., -II SEM

Course Title: ENGINEERING PHYSICS	Course Code: AS20-00BS08
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs +16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics. 2. The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory. 3. The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.	

Course Overview:

This course deals with quantum principles and explores their applications in studying the behavior of fundamental entities of atom. It deals with semiconductor devices which are employed in designing electronic systems and in communication field. It deals with the fundamental properties of dielectric and magnetic materials and explore their application in all engineering streams.

Course Objective

1. Student explores the dual nature of the particle and applications of Schrodinger Equation.
2. Student identifies the Concept of Energy band formation and analyzes classification of solids.
3. Student distinguishes the differences between Intrinsic and Extrinsic Semiconductors
4. Student explores the different applications of semiconductor devices.
5. Student identifies the behaviour of solids under electric and magnetic field and Understand the concept of superconductivity
6. Student interprets the characteristics of Lasers, types of Lasers, Optical fiber principle and their applications.

Course Outcomes(s)

CO#	Course Outcomes
C122.1	Interprets the dual nature of matter waves using quantum principles.
C122.2	Differentiates the physical properties of conductors, insulators and semiconductors using energy band.
C122.3	Identifies the different types of semiconductors using Hall Effect
C122.4	Analyzes the different properties of semiconductor devices and their applications.
C122.5	Explores the different types of Dielectric and Magnetic materials and their applications in different fields.
C122.6	Identifies the different characteristics and applications of lasers and fiber optics

COURSE CONTENT (SYLLABUS)

UNIT I: QUANTUM MECHANICS

Introduction to Quantum Mechanics (Origin of QM), Dual nature of particles, De Broglie's hypothesis, Matter waves, Heisenberg's uncertainty principle, Photo-electric effect(qualitative), Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT II: INTRODUCTION TO SOLIDS

Classical Statistics – Maxwell-Boltzmann Distribution(qualitative) Quantum Statistics – Bose-Einstein statistics(qualitative), Fermi – Dirac statistics(qualitative), Density of Energy states, Electrons in a periodic potential – Bloch theorem, Kronig – Penny Model(qualitative), Brillouin Zones (E-K curve), Concept of effective mass of electron, Energy band formation in solids, Classification of solids into Metals, Semiconductors and insulators.

UNIT III: SEMICONDUCTOR PHYSICS AND DEVICES

Semiconductor Physics: Intrinsic and Extrinsic semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Hall Effect.

Semiconductor Devices: PN Junction Diode – Junction Formation, Energy Band Diagram, V-I characteristics of PN junction diode, Direct and Indirect band gap semiconductors, LED & Solar cell.

UNIT IV: DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectric properties: Introduction, Types of Polarizations (Electronic and Ionic) and Calculation of their polarizabilities, Internal fields in solids: (Lorentz Method), Clausius-Mossotti relation, Piezoelectricity, Ferroelectricity, Pyro-electricity and their applications.

Magnetic Properties: Introduction, Bohr magneton, classification of magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Applications.

Superconductors: Introduction, type – I and type – II Superconductors, Applications of Superconductors

UNIT V: LASERS AND FIBER OPTICS

Lasers: Introduction, Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Relation between Einstein's Coefficients, Population inversion, Metastable state, Pumping, Block Diagram of laser, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers in Defense, Medical field.

Fiber Optics: Introduction to optical fiber, Construction and working of an Optical Fiber, Acceptance angle, Numerical aperture, Types of Optical fibers – Mode & Propagation through Step and Graded index fibers, Attenuation, Applications of optical fibers in Communication System and Sensors.

Text Books:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Halliday and Resnick, Physics - Wiley

References Books:

1. Engineering physics 2nd edition –H.K.Malik and A.K. Singh Richard.
2. Introduction to Solid State Physics - Charles Kittel

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_ph24/preview
2. https://onlinecourses.nptel.ac.in/noc20_ph16/preview
3. <https://www.coursera.org/learn/semiconductor-physics>
4. <https://www.coursera.org/lecture/leds-semiconductor-lasers/active-optical-devices-specialization-introduction-0jner>

Web Reference/E-Books:

1. Physics for Engineers by N. K. Verma
2. Essentials of Applied Physics by Royal M. Frye

PROGRAMMING FOR PROBLEM SOLVING

I B.Tech., - II SEM

Course Title: PROGRAMMING FOR PROBLEM SOLVING	Course Code: AS20-05ES01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Mathematics knowledge, Analytical and Logical skills	

Course Overview:

It introduces students to the field of computer science as a discipline for solving problems through computation and provides the foundation for more advanced courses on programming and software development.

Course Objective

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes(s)

CO#	Course Outcomes
C123.1	Designs algorithms and draws flowcharts for solving problems.
C123.2	Converts the algorithms/flowcharts to C programs.
C123.3	Develops the code and tests a given logic in C programming language.
C123.4	Dissects a problem into functions and develops modular reusable code.
C123.5	Demonstrates arrays, pointers, strings and structures in C.
C123.6	Explains Searching and sorting problems.

COURSE CONTENT (SYLLABUS)

UNIT - I

Problem Solving Using Computers: Computer Overview, Introduction to components of a computer system, Algorithms, Flowchart, Pseudo code with examples, Number systems (Decimal & Binary Conversion).

Overview of C : History of C, Basic structure of C- program, Creating and Running C-Program, Input and output statements.

UNIT - II

Fundamentals of C: C-Tokens, Data types, Operators, Expressions, Type conversions, Types of Errors, Input and output statements. Control Statements in C, Decision making and branching, Decision making and Looping statements.

UNIT – III

Structured Programming :Functions: Syntax, Steps ,Types and Category of Functions, parameter passing mechanism. Recursion and Storage Classes

Dynamic memory allocation: malloc(), calloc(), realloc(), free() with example

UNIT - IV

Arrays & Strings: Declaration , Initialization and Accessing Elements, String handling functions, Array of Strings. Structures and Unions: Defining structures, initializing structures, unions, Array of structures, self referential structures.

Pointers: Types of Pointers Use of Pointers, Dereferencing operations, Examples

UNIT - V

Numerical methods: Roots, Integration and Differentiation Methods, Examples
Linked List: Definition, Types, Implementation Using Self referential Structures:
Files: (only if time is available, otherwise should be done as part of the lab)

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Ashok N. Kamthane, Programming in C, 2/e, Pearson Education.
4. Programming with C, by K.R. Venugopal, Tata Mcgraw Hill Publishing Co Ltd

References Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/learn/computational-thinking-problem-solving>
2. nptel.ac.in/courses/106105085/4
3. nptel.ac.in/courses/106105085/2

Web Reference/E-Books:

1. https://onlinecourses.nptel.ac.in/noc18_cs33/preview
2. <http://www.thenewboston.com/>
3. <https://www.codesdope.com/>

ENGINEERING GRAPHICS AND DESIGN
I B.Tech., II SEM

Course Title: ENGINEERING GRAPHICS AND DESIGN	Course Code: AS20-03ES02
Teaching Scheme (L:T:P): 2:0:3	Credits: 3.5
Type of Course: Lecture + Practical	Total Contact Periods: 32Hrs+ 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:

Engineering graphics & Design has a well-defined set of standards by which technical drawings are produced. This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

Course Objective

The objectives of this course are to

- To know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
- To understand the importance of engineering curves.
- To learn to use the orthographic projections for points, lines, planes and solids in different positions.
- To make the students draw the projections of the planes.
- To understand the isometric projections.
- To create simple solid models of various domain applications.

Course Outcomes(s)

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

CO#	Course Outcomes
C124.1	Apply the concepts of engineering curves in construction using AutoCAD.
C124.2	Solve the problem of projections of points and lines, in different positions using AutoCAD.
C124.3	Solve the problem of projections of planes and solids in different positions using AutoCAD.
C124.4	Solve the problems of Projections of solids and its positions using AutoCAD.
C124.5	Solve the problems on Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions using AutoCAD.
C124.6	Solve the problems on Orthographic Projections and its conversions using AutoCAD.

COURSE CONTENT (SYLLABUS)

Introduction to AutoCAD Software: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

UNIT I:

Introduction to Engineering Drawing: Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.

Engineering Curves: Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

UNIT II:

Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes.

Projections of Planes: Projections of Planes- Surface Inclined to both the Planes.

UNIT III:

Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone.

Sections and Sectional Views: Right regular solids - prism, cylinder, pyramid, cone – use of Auxiliary views.

UNIT IV:

Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids.

UNIT V:

Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

Introduction to Solid Modelling: Creation of simple solid models relevant to the domain.

Text Books:

1. Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016.
2. Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, SciTech Publishers, 2010.
3. Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.
5. Engineering graphics and design, Pradeep Jain, A.P Gautam and Ankitha Maheshwari.

References Books:

1. Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton (Auto CAD 2019), 1st Edition, John Wiley & Sons, Indianapolis, Indiana.
2. AutoCAD Software Theory and User Manuals.
3. Engineering Design, George E. Dieter, Linda C. Schmidt/third edition.
4. Engineering Drawing and design, Cencell Jonson, Jay D. Hesel, Dennis R. Short.
5. Engineering Drawing, Jolhe/fourth edition.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/112/103/112103019/>
2. <https://nptel.ac.in/courses/112/104/112104172/>

Web Reference/E-Books:

1. <http://nptel.ac.in/courses/112103019>
2. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_science_students/engineeringdrawing.pdf

Software Required: AutoCADD

UNIVERSAL HUMAN VALUES II
I B.TECH -II SEM

Course Title: UNIVERSAL HUMAN VALUES II	Course Code: AS20 – 00HS07
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must have basic knowledge of Need, Basic Guidelines, Content and Process for Value Education 2. Understanding Harmony in the Human Being - Harmony in Myself 3. The student must have fundamental knowledge Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship 4. The student can able to Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	

Course Overview:

This course is designed for transferring the right understanding and definite human conduct in the students. The conduct of every human differs from human to human. Through this course an attempt is being made to introduce the definite human conduct in students. The conduct of a human being can be definite only if knowledge of right understanding and right human conduct is taught to them.

Course Objective

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Course Outcome(s)

CO#	Course Outcomes
C125.1	Basic guideline of human values universally.
C125.2	Understanding the harmony in the human being
C125.3	Learn the rights and responsibilities as an employee, team member and a global citizen
C125.4	To know about society – Harmony @ human relation
C125.5	The student can study the professional ethics and values.
C125.6	Understand the importance of Values and Ethics in their personal lives and Professional careers

COURSE CONTENT (SYLLABUS)

UNIT – I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values-I- Self-Exploration–what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels. (Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in

relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking)

UNIT – II

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient 'I' and the material 'Body' . Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT- III

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and selfregulation in nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT – V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly, and eco-friendly production systems, c. Ability to identify and develop appropriate, technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations, Sum up, Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

E-RESOURCES:

1. <https://www.yourmorals.org/schwartz.2006.basic%20human%20values.pdf>
2. https://web.archive.org/web/20080311200942/https://kroc.nd.edu/ocpapers/op_16_1.pdf
3. https://kroc.nd.edu/ocpapers/op_16_1.pdf
4. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fl4ciefThZdeN_vQ:1607766793377&q
5. https://www.researchgate.net/publication/270388493_Variations_in_Value_Orientation

WEB REFERENCES:

1. <https://furhhd.org/our-programmes/education-and-ethics/universal-human-values-ethics/>
2. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fl4ciefThZdeN_vQ:1607766793377&qWEB RESOURCES
3. <https://www.un.org/press/en/2003/sgsm9076.doc.htm>
4. <https://www.kobo.com/ebook/the-psychology-of-conservatism-routledge-revivals>

APPLIED PHYSICS LAB
I B.Tech., II SEM

Course Title: APPLIED PHYSICS LAB	Course Code: AS20-00BS09
Teaching Scheme (L:T:P): (0:0:3)	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must know the usage of basic tools for measurement of physical quantities. 2. The students must have knowledge of error analyses, types of errors, principles of optics, mechanics, waves and Oscillations	

Course Overview:

The course deals with experiments in various fields of physics such as Wave Optics, Wave mechanics, Electronics, Electricity and Magnetism.

Course Objective

- To identify the active and passive elements and gain ability to build electronic circuits for solving complex engineering problems.
- To classify the semiconductor materials into p-type or n-type semiconductor and estimate the energy gap of semiconductor diode
- To explore the characteristics of optoelectronic devices
- determines the work function of given material.
- estimate magnetic field intensity and explores the generation of magnetic field.
- To determines the properties of optical fibers using lasers

Course Outcomes(s)

CO#	Course Outcomes
C126.1	Compute time constant of RC circuit and resonant frequency of LCR circuit.
C126.2	Identify the type of semiconductor using Hall Effect and determine the Energy gap of a semiconductor diode.
C126.3	Analyze the V-I characteristics of Solar cell and LED.
C126.4	Evaluate work Function of a photo metal using photo electric effect.
C126.5	Summarize the variation of Magnetic Field along the current carrying coils.
C126.6	Estimate the light gathering ability and bending losses of Optical fibers.

COURSE CONTENT (SYLLABUS)

The students have to perform any eight of the following experiments

1. LCR Circuit: To study the frequency response of LCR series and parallel resonance circuit.
2. R-C Circuit: To study the time response of RC circuit.
3. Hall Effect: To determine Hall voltage and Hall Coefficient of given semiconductor material.
4. Energy Gap: To determine the energy gap of a given Semiconductor.
5. Solar Cell: To study V-I Characteristics of Solar Cell.
6. LED: To study the V-I characteristics of LED.
7. Photoelectric effect: To determine the work function of given material.
8. Stewart- Gee apparatus – To study the variation of magnetic field along the axis of circular current carrying loop.
9. Optical fibre: To determine the Numerical aperture and Acceptance angle of a given fibre.
10. Optical fibre: To study the bending losses in Optical fibres.

References Books:

1. Practical physics by Dr. Aparna, V.G.S. publications.
2. Physics practical lab manual –SPEC

Online Resources

1. <https://www.futurelearn.com/courses/teaching-practical-science-physics>
2. <https://www.vlab.co.in/broad-area-physical-sciences>

PROGRAMMING FOR PROBLEM SOLVING LAB
I B.Tech., II SEM

Course Title: PROGRAMMING FOR PROBLEM SOLVING LAB	Course Code: AS20-05ES02
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:- Mathematics knowledge, Analytical and Logical skills	

Course Overview:

This course provides the fundamental concepts of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

Course Objective

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes(s)

CO#	Course Outcomes
C127.1	Develops algorithms for simple problems.
C127.2	Translate given algorithms to a working and correct program.
C127.3	Identifies and correct syntax errors as reported by the compilers.
C127.4	Identifies and correct logical errors encountered during execution.
C127.5	Demonstrates data operations using arrays, strings, structures and pointers of different types.
C127.6	Creates, reads and writes to and from simple text and binary files.

COURSE CONTENT (SYLLABUS)

Practice Sessions:

Week1:

Tutorial 1: Problem solving using computers(Creating, Compiling & Running Steps , Basic Structure of C Program)-:

Lab1: Familiarization with programming environment

Week2:

Tutorial 2: Variable types and Rules, Formatted I/O statements

Lab 2: Reading and Displaying Different Values Using scanf() & Printf()

Week3:

Tutorial 3: Types of Operators

Lab 3: Simple Computational problems using operators

Week4:

Tutorial 4: Branching and logical expressions:

Lab 4: Problems involving if-then-else structures

Week5:

Tutorial 5: Loops, while, do-while and for loops:

Lab 5: Iterative problems e.g., sum of series, sum of n- natural numbers

Week6:

Tutorial 6: 1D Arrays: searching, sorting:

Lab 6: 1D Array manipulation : insertion, selection and bubble sort

Week7:

Tutorial 7: 2D arrays and Strings

Lab 7: Matrix problems, String operations, string sorting , palindrome string

Week8:

Tutorial 8: Functions, call by value:

Lab 8: Simple functions: factorial ,sum of individual digits, Fibonacci series etc.,

Week9:

Tutorial 9: Recursion, structure of recursive calls

Lab 9: Recursive functions: factorial, Fibonacci, GCD and towers of Hanoi

Week10:

Tutorial 10: Pointers, structures and dynamic memory allocation

Lab 10: Problem solving using Pointers and structures

Week11:

Tutorial 11: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 11: Programming for solving Numerical methods problems

Week12

Tutorial 12: Single Linked List using self referential structures

Lab 12: Implementation of Single linked list using self referential structures

Week13:

Tutorial 13: File data type , File pointer, modes of operations, file handling functions

Lab 13: Programs using file handling functions: File copy, Merging of Files

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

References Books:

1. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
2. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <http://nptel.ac.in/courses/106105085/>
2. <http://nptel.ac.in/courses/106106127/>

Web Reference/E-Books:

1. www.leetcode.com
2. www.thenewboston.com
3. www.codesdope.com

ENGINEERING PRACTICES
I B.Tech. II SEM

Course Title: ENGINEERING PRACTICES	Course Code: AS20-03ES04
Teaching Scheme (L:T:P): 0:0:4	Credits: 2
Type of Course: Practical	Total Contact Periods: 64 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:

Mechanical Engineering Practices is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment.

Course Objective

The objectives of this course are to

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes(s)

CO#	Course Outcomes
C128.1	Apply the concepts of engineering workshop practice on machine tools and their operations.
C128.2	Expertise on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
C128.3	Recognize the tools and apply different trades of Engineering practices on drilling, material removing, measuring, chiseling etc.
C128.4	Apply basic knowledge on electrical engineering for house wiring practice.
C128.5	Manufacture the given material to desired product in a particular pattern by tin smithy.
C128.6	Mould the component of different size and shape by black smithy in on Furnace

COURSE CONTENT (SYLLABUS)

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint).
- II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit).
- III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel).
- IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern).
- V. Welding Practice – (Arc Welding & Gas Welding).
- VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light).
- VII. Black Smithy – (Round to Square, Fan Hook and S-Hook).

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working.

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

References Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/112/107/112107145/>
2. <https://nptel.ac.in/courses/112/107/112107144/>

Web Reference/E-Books:

1. https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-ye4C
2. <https://www.youtube.com/watch?reload=9&v=4gpjof5ESKQ>

SOFT SKILLS 2
I B.Tech., II SEM

Course Title: Soft Skills 2	Course Code: AS20-00HS04
Teaching Scheme (L:T:P):2:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

Course Objective: -

1. To develop Optimistic Nature.
2. To enhance the skills related to Group Discussion.
3. To make the students to have commitment.
4. To have dedication as well determination.
5. To develop confidence.

Course Outcomes:

CO#	Course Outcomes
C129.1	Analyze excellent behavioral attitude.
C129.2	Apply amicable solutions to problematic issues in life.
C129.3	Understand the importance of functional and practical work.
C129.4	Create goal oriented personality.
C129.5	Understand soft skills and life skills.
C129.6	Remember to be committed and determined.

COURSE CONTENT (SYLLABUS)

UNIT I: Linguistic Ability

Writing Skills - Reading Skills - Listening Skills - Speaking Skills - Just a Minute Program – JAM – Improving Vocabulary.

UNIT II: Effective Communication

Introduction – Communicative Methodology – Way to Communicate perfectly – Communicative series – Descriptive Communication – Process of Communication – Barriers of Communication – Essentials of Communication – Improving existing Communication – Strategies to improve Communication – Corporate Communication – Assess the Communication – How to be a successful Communicator.

UNIT III: Ethical Values

Meaning of Ethics- Importance of Education – Moral Values – Eradication of problems – Influence of the society – Developing self-motivational skills – Source of Ethics – Develop Ethics – Ethics related to Life.

UNIT IV: Confidence

Self Confidence – Self Esteem – Importance of Confidence – Right decision Making – Turn towards Productivity – Things can be had with Confidence – Self Identity – Building good career – Self Reliance – Quotes of Confidence.

UNIT V: Introduction – Initiation – Verbal Oriented – Purpose of Group Discussion –Importance of Group Discussion – Involvement in Group Discussion - Learning Attitude – Skill Development Platform – Primary Level Topics and Discussion – Able Participation – Practice Group Discussion.

Text Books:

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips <https://www.youtube.com/watch?v=VczVqHJW0gg>
2. Effective Communication Skills Training Video in Hindi <https://www.youtube.com/watch?v=kxAXOh5RmwU>
3. A guide to effective communication <https://www.youtube.com/watch?v=JwjAAgGi-90>
4. A Failure to Communicate <https://www.youtube.com/watch?v=8Ox5LhJSBE>
5. Non Verbal Communication <https://www.youtube.com/watch?v=SKhsavlvuao>

**B.Tech.,
SECOND YEAR
FIRST SEMESTER
SYLLABUS**

DATA STRUCTURES

II B.Tech I SEM

Course Title: Data Structures	Course Code: AS20-72PC01
Teaching Scheme (L: T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving	

Course Overview:

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

Course Objective

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose an appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To learn to implement ADTs such as lists, stacks, queues, trees, graphs, search trees in C++ to solve problems.

COURSE CONTENT

UNIT - I

Introduction to Data Structures: abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

UNIT - II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. **Hash Table Representation:** hash functions, collision resolution-separate chaining, open addressing, linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT – III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods. **Sorting:** Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan Cengage Learning.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA
II B.TECH., I SEMESTER

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA	Course Code: AS20-05PC01
Teaching Scheme (L:T:P)3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: - Programming for Problem Solving	

Course Overview:

The Course provides a comprehensive coverage of conceptual and practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. At the outset, the course ignites Object Oriented thinking and explores with the evolution of Java and its basics. It gives strong foundation on Inheritance, Packages and Interfaces and also discusses Exception Handling and Multithreaded mechanisms. The course examines java concepts such as Applets and Event handling.

Course Objective

- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
- To introduce the implementation of packages and interfaces.
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes(s)

CO#	Course Outcomes
C212.1	Solves real world problems using OOP techniques.
C212.2	Understands the use of abstract classes.
C212.3	Solves problems using java collection framework and I/O classes.
C212.4	Creates multithreaded applications with synchronization.
C212.5	Develops applets for web applications.
C212.6	Designs GUI based applications.

COURSE CONTENT

UNIT – I

Object-oriented thinking: Away of viewing world–Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies-Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling, String Tokenizer, Buffer Reader class ,scanner class.

UNIT – II

Inheritance: Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism: adhoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

Interfaces: defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

UNIT – III

Packages: Defining a Package, CLASSPATH, Access protection, importing packages.

Exception handling: Fundamentals of exception handling, Exception types, Termination or presumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.

UNIT – IV

Multithreading: Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, and inter thread communication.

Applets: Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets.

UNIT – V

AWT: Fundamentals, Components of AWT, Layout Managers.

Event Handling: The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes, A Simple Swing Application.

TEXT BOOKS:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCES BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/learn/c-plus-plus-a>
2. <https://www.coursera.org/learn/c-plus-plus-b>
3. <https://www.coursera.org/learn/object-oriented-java>
4. <https://www.coursera.org/specializations/java-object-oriented>

WEB REFERENCE/E-BOOKS:

1. <http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW>
2. <http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf>
3. <http://www.nptel.ac.in/courses/106103115/36>

**OPERATING SYSTEMS
II B.TECH., I SEMESTER**

Course Title: OPERATING SYSTEMS	Course Code: AS20-05PC06
Teaching Scheme (L:T:P): (3:1:0)	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Computer Architecture	

Course Overview:

This course enables the students to interpret main components of operating system and their working, identify the role of Operating System in process scheduling and synchronization, analyze the way of addressing deadlock, understand memory management techniques and I/O systems, describes the way of handling files and security.

Course Objective

- To understand the OS role in the overall computer system.
- To study the operations performed by OS as a resource manager.
- To understand the scheduling policies of OS.
- To understand the different memory management techniques.
- To understand process concurrency and synchronization.
- To understand the concepts of input/output, storage and file management.
- To understand the goals and principles of protection.
- Introduce system call interface for file and process management.
- To study different OS and compare their features.

Course Outcomes(s)

CO#	Course Outcomes
C213.1	Compares the different operating systems and basic architectural components involved in OS design
C213.2	Solves problems related to the process management
C213.3	Analyzes the deadlocks and solves the problem of deadlock
C213.4	Solves the problem of process communication and inter process communication
C213.5	Explains the concept of Memory management
C213.6	Explains the concept of File system management and its application

COURSE CONTENT

UNIT - I

Operating System: Introduction, Structures: Simple Batch, Multi programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls.

UNIT – II

Process and CPU Scheduling: Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple: Processor Scheduling.

System call interface for process management: fork, exit, wait, waitpid, exec

UNIT - III

Deadlocks: System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

Process Management and Synchronization: The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors

UNIT - IV

Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

Memory Management and Virtual Memory: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT - V

File System Interface and Operations: Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

Case Studies: Linux system design Principles and architecture, Windows design principles and architecture.

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition.
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

REFERENCES BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI.
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/learn/embedded-operating-system>
2. nptel.ac.in/courses/Webcourse.../Operating%20Systems

WEB REFERENCE/E-BOOKS:

1. <http://geeksforgeeks.org/Operating Systems/>

PRINCIPLES OF ARTIFICIAL INTELLIGENCE

II B.Tech I SEM

Course Title: PRINCIPLES OF ARTIFICIAL INTELLIGENCE	Course Code: AS20-72PC02
Teaching Scheme (L: T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving	

Course Objectives:

- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

COURSE CONTENT

UNIT – I:

Introduction: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Sub areas of AI Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

UNIT – II:

Introduction to Search: Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha – Beta pruning.

UNIT – III:

Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

UNIT-IV:

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees, Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V:

Pattern Recognition: Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods – Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbour (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

TEXT BOOKS:

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004
3. Artificial Intelligence – A Modern Approach – Stuart Russell and Peter Norvig, Pearson Education.
4. Artificial Intelligence – Elaine Rich and Kevin Knight, McGraw-Hill

REFERENCE BOOK:

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4. Artificial Intelligence by George Fluger Pearson fifth edition.
5. Introduction to Artificial Intelligence – E Charniak and D McDermott, Pearson Education

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
II B.TECH., I SEMESTER

Course Title: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	Course Code: AS20-00HS06
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
<p>Prerequisites:</p> <ol style="list-style-type: none"> 1. The student must have basic of business, micro and macro-economic environment. 2. The student understands the demand and demand forecasting methods. 3. The student must have a fundamental of production and pricing methods. 4. The students can understand the basic of financial management 5. The student can able to understand the ratio how its impact the company financial position. 	

Course Overview:

The present course is designed in such a way that it gives an overview of concepts of Economics. Managerial Economics enables students to understand micro environment in which markets operate how price determination is done under different kinds of competitions. Financial Analysis gives clear idea about concepts, conventions and accounting procedures along with introducing students to fundamentals of ratio analysis and interpretation of financial statements. Break Even Analysis is very helpful to the Business Concern for Decision Making, controlling and forward Strategic Planning. Ratio analysis gives an idea about financial forecasting, financial planning, controlling the business and decision making.

Course Objective

1. To understand the Business, impact of Micro and Macro Economic Environment on business decisions.
2. To learn the basic business types, impact of the economy on Business and Firms specifically.
3. To prepare, analyze, interpret the financial statements for business decision making.
4. To Understand the Principles of Accounting, Accounting Process.
5. To analyse the financial statement of a company.
6. To apply ratio's to find out financial position of the company.

Course Outcomes(s)

CO#	Course Outcomes
C215.1	Understand the Economic Principles in Business
C215.2	Analyse the Forecast Demand and Supply
C215.3	Understand Production and Cost Estimates
C215.4	Apply Market Structure and Pricing Practices.
C215.5	Understand the firm's financial position.
C215.6	Analyse the Financial Statements of a Company

COURSE CONTENT

UNIT – I

Introduction to Business and Economics: Business: Nature and scope of business, Structure of Business Firm, Theory of Firm, Types of Business Entities, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: The themes of economics, scarcity and efficiency, three fundamental economic problems, society's capability, Production possibility frontiers (PPF), Productive efficiency Vs economic efficiency, economic growth & stability, Micro economies and Macro economies, relationship between micro, macro and managerial economics with other discipline, the role of markets and government, Positive Vs negative externalities.

UNIT – II

Demand and Supply Analysis: Determinants of demand and supply, Demand and Supply Function, Law of Demand and supply, Elasticity of Demand and supply, Types of Elasticity, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making,

Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Case study.

UNIT- III

Production Analysis: Factors of Production, Production Function concepts, law of variables proportion, Returns to Scale, Different Types of Production Functions. Cost analysis: different Costs concepts, Short run and Long run Cost Functions, Revenue curves of firms.

Market Structures: Market classification, Perfect and imperfect competition, Monopoly, Monopolistic competition, Duopoly, Oligopoly. Pricing methods and strategies: Objectives, Factors, General consideration of pricing, methods of pricing, Dual pricing, Price discrimination. Product Life Cycle based Pricing, Break Even Analysis. Case study

UNIT - IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance subsidiary book, Elements of Financial Statements, and Preparation of Final Accounts. Problems

UNIT – V

Financial Analysis through Ratios: Concept of Ratio Analysis, importance of ratio Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS

1. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. I.M .Pandey, Financial Management, Vikas Publishing House. New Delhi.

REFERENCE BOOKS

1. Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011
2. Yogesh, Maheswari, Management Economics, PHI learning, New Delhi, 2012.
3. Karl E. Case and Ray C. Fair, Principles of Economics, Pearson Education Inc., 8th Edition, 2007.
4. Dominick Salvatore, Theory and Problems of Micro Economic Theory. Tata Mac GrawHill, New Delhi.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_hs28/preview
2. https://onlinecourses.nptel.ac.in/noc19_ma07/preview
3. https://onlinecourses.nptel.ac.in/noc19_mg01/preview

NPTEL Video Course:

1. <https://www.youtube.com/watch?v=51-nXPx3cw4&list=PLbMVogVj5nJTG7ahmEJc4MlcGT0hCr5ik>
2. <https://www.youtube.com/watch?v=vLPpF0hunwc&list=PLbMVogVj5nJRTAVF4-tueujAFiLKIV3Mo>

WEB REFERENCE/E-BOOKS:

1. www.icsi.edu
2. <https://www.inderscience.com/jhome.php?jcode=gber>
3. https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CACESb6rwhRhZS92IOPgv9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEIt7RmTvoMTMUwkt98PF&sig=AOD64_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVJzDgGHXDgDFAQ00Qx6BAgCEAE

DATA STRUCTURES LAB
II B.Tech., I SEM

Course Title: Data Structures Through C Lab	Course Code: AS20-72PC03
Teaching Scheme (L: T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving Lab	

Course Overview:

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

Course Objective

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues

LIST OF EXPERIMENTS:

1. Write a program that uses functions to perform the following operations on singly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using
i) Arrays ii) Pointers
5. Write a program that implement Queue (its operations) using
i) Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers
in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
7. Write a program that use both recursive and non-recursive functions to perform the following
searching operations for a Key value in a given list of integers:
i) Linear search ii) Binary search
8. Write a program to implement the tree traversal methods.
9. Write a program to implement the graph traversal methods.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, *PHI/Pearson Education*.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition,
2. R. F. Gilberg and B. A. Forouzan, Cengage *Learning*.

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
II B.TECH., I SEMESTER**

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	Course Code: AS20-05PC03
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: - Data Structures	

Course Overview:

The hands-on course provides a comprehensive coverage of practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course stress on the strengths of Java to write efficient, maintainable, and portable code. The course focuses on a different aspect of core Java Environment suitable for advance learning, teaching, research, and commercial software development. At the outset it revise the control statements and then explores with the concepts of Inheritance and Interfaces. Exception Handling, Multithreaded mechanisms and File I/O is also been practiced. The concepts such as AWT Controls, Event handling, Applets and Swings are deeply Practiced to build GUI based applications. Overall, the knowledge of this course is essential to learn other similar OOP based technologies and advanced Java and hence stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework, and to build Mini and Major Project Work applications.

Course Objective

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls inJava.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes(s)

CO#	Course Outcomes
C217.1	Develop a java Program using basic java concepts
C217.2	Create a java program that implements Exception handling
C217.3	Generates a java which implements multithreaded concepts.
C217.4	Develop a java program which implements java collection framework
C217.5	Design a java program which implements events
C217.6	Design a java program which implements AWT components

COURSE CONTENT

1. a) Write a Java Program to Reverse a given Number.
b) Write a Java Program to Find the Factorial of a Given Number.
2. a) Write a Java Program to Generate a Random Number.
b) Write a Java Program to find a given number is Armstrong or Not.
3. a) Write a Java Program to copy all elements from one array into another array
b) Write a Java Program to Perform Linear Search on Given Series

4. Write a Java Program to show case application of Constructor.
5. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
6. a) Develop an applet in Java that displays a simple message.
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
7. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
8. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
9. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program to list all the files in a directory including the files present in all its subdirectories.
13. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order
14. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

TEXT BOOKS:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCES BOOKS:

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/learn/c-plus-plus-a>
2. <https://www.coursera.org/learn/c-plus-plus-b>
3. <https://www.coursera.org/learn/object-oriented-java>
4. <https://www.coursera.org/specializations/java-object-oriented>

WEB REFERENCE/E-BOOKS:

1. <http://www.nptel.ac.in>
2. <http://www.javaworld.com>

**OPERATING SYSTEMS LAB
II B.TECH., I SEMESTER**

Course Title: OPERATING SYSTEMS LAB	Course Code: AS20-05PC09
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming through Java Lab	

Course Overview:

This Laboratory covers the major methods of inter process communications (IPC), which is the basis of all client / server applications under UNIX, Linux utilities. There will be extensive Programming exercises in shell scripts. It also emphasizes various programming concepts in IPC, multithreaded programming and socket programming.

Course Objective

- To learn Unix commands and shell programming.
- To implement various CPU Scheduling Algorithms.
- To implement Process Creation and Inter Process Communication.
- To implement Deadlock Avoidance and Deadlock Detection Algorithms.
- To implement Page Replacement Algorithms.
- To implement File Organization and File Allocation Strategies.

Course Outcomes(s)

CO#	Course Outcomes
C218.1	Applies basic services and functionalities of the operating system using system calls
C218.2	Writes programs for using system calls
C218.3	Implements Bankers algorithm for deadlock avoidance and prevention
C218.4	Implements semaphores for producer-consumer problem
C218.5	Illustrates the IPC mechanisms
C218.6	Constructs the memory management techniques

COURSE CONTENT

1. Write C programs to simulate the following CPU Scheduling algorithms
a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system
(open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
a) Paging b) Segmentation

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, *Pearson* education.

REFERENCES BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition– 2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.udacity.com/course/introduction-to-operatingsystems>
2. [nptel.ac.in/courses/Web course./Operating% 20Systems](http://nptel.ac.in/courses/Web%20course/Operating%20Systems)

WEB REFERENCE/E-BOOKS:

1. [http://geeksforgeeks.org/Operating Systems/](http://geeksforgeeks.org/Operating%20Systems/)

ENVIRONMENTAL SCIENCES

II B.Tech., I SEM

Course Title: Environmental Sciences	Course Code: AS20-00MC01
Teaching Scheme (L:T:P): 3:0:0	Credits:0
Type of Course: Lecture	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks

Course Objective: To learn

- The importance of ecological balance for sustainable development.
- The impacts of developmental activities and mitigation measures.
- The environmental policies and regulations.
- New developmental projects for sustainable development of nations.

Course Outcomes (s)

CO#	Course Outcomes
C219.1	Understand the importance of ecological balance and principles
C219.2	Evaluates the impact of developmental activities on ecological balance
C219.3	Understand various environmental acts and policies
C219.4	Gain knowledge about effect of Environment on Human health
C219.5	Understands the importance of environmental regulations helping in sustainable development
C219.6	Develop technologies for the sustainable development based on ecological principles

COURSE CONTENT (SYLLABUS)

UNIT-I

Ecosystem: Definition, scope and importance of ecosystem, classification, structure and function of an ecosystem, food chains, food web, Ecological Pyramids, Flow of energy, biochemical cycles, bio accumulation, bio magnification, Carrying capacity, ecosystem value services.

UNIT-II

Natural resources: Water resources: use and over utilization of surface and ground water, floods and droughts, measures taken to mitigate the intensity of floods and droughts. Dams: benefits and problems. Mineral resources: Use and exploitation, Environmental effects of extracting mineral resources, Land resources: Forest resources, uses of forests, causes of Deforestation. Energy resources: Growing energy needs, Renewable and non-renewable energy sources. Use of alternative energy sources and case studies. Projects of renewable energy resources in different states of India.

UNIT-III

Biodiversity and Biotic resources: Introduction, definition, genetic, species and ecosystem diversity. Value of biodiversity, Consumptive use, productive use, social, ethical, aesthetic and optional values. India as a megadiversity nation. Hot spots of biodiversity. Threats to biodiversity, conservation of biodiversity: in-situ and ex-situ conservation and national biodiversity act.

UNIT-IV

Environmental pollution and control technologies: Environmental pollution: classification of pollution, Air pollution: primary and secondary pollutants, Automobile and Industrial pollution, ambient air quality standards. Water pollution: sources and types of pollution, drinking water quality standards. Soil pollution: sources and types, impacts of modern agriculture, Degradation of soil. Noise pollution: sources and health hazards, standards. Solid waste: characterization and management. e-waste and its management. **Pollution control technologies:** Wastewater treatment methods: primary, secondary and tertiary. Overview of air pollution control technologies. **Global environmental problems and global efforts:** Climate change and impacts on human environment. Ozone depletion and ozone depleting

substances (ODS). International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol.

UNIT-V

Environmental policy, legislation and EIA: Environmental protection act, legal aspects, Air act-1981, Water act, Forest act, Wild life act, Municipal solid waste management and handling rules, biomedical waste management and handling rule, Hazardous waste management and handling rule. EIA: EIA structure, methods of base line data acquisition, overview on impacts of air, water, biological and socio-economical aspects, strategies for risk assessment, concepts of environmental management plan (EMP). Towards sustainable future: concept of sustainable development, population and its explosion, crazy consumerism, Rain water harvesting, Environmental education, Urban sprawl, Human health, Environmental ethics, Concept of green building, Life cycle assessment (LCA).

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Textbook of Environmental Science and Technology- Dr. M. Anji Reddy, BS Publications.
3. Environmental Studies by Anubha Kaushik, New Age International Publishers.

REFERENCE BOOKS:

1. Environmental Studies by R. Rajagopalan, Oxford University press.
2. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.
3. Environmental Science: Towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd, NewDelhi.

Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/120/108/120108002/>
2. https://onlinecourses.nptel.ac.in/noc20_ge16/preview
3. <https://nptel.ac.in/courses/121/106/121106014/>
4. <https://nptel.ac.in/courses/120/108/120108004/>

Web Reference/E-Books:

S.No	Advanced concepts	Website Referred
1	Ecosystem	https://youmatter.world/en/definition/ecosystem-definition-example/
2	Natural Resources	https://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/natural_resources/
3	Biodiversity	https://www.nationalgeographic.org/encyclopedia/biodiversity/ https://www.natureserve.org/conservation-tools/biodiversity-indicators-dashboard
4	Pollution	https://www.nationalgeographic.org/encyclopedia/pollution/ https://www.livescience.com/22728-pollution-facts.html https://www.worldwildlife.org/threats/pollution https://www.nrdc.org/stories/air-pollution-everything-you-need-know https://www.who.int/health-topics/air-pollution#tab=tab_1 https://www.history.com/news/7-deadly-environmental-disasters https://www.insider.com/worst-modern-manmade-disasters-world-environment-day-2019-5
5	Environmental policy	https://www.britannica.com/topic/environmental-policy https://www.unece.org/fr/env/welcome.html
6	EIA	http://alphace.ac.in/downloads/notes/cv/10cv847.pdf

**IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI
II B.TECH., I SEMESTER
VALUE ADDED COURSE**

Course Title: IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI	Course Code: AS20-12PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

Course Overview: The Internet of Things is transforming our physical world into a complex and dynamic system of connected devices on an unprecedented scale.

Course Objective: The objectives of this course are, In this course, student will explore various components of Internet of things such as Sensors, internetworking and cyber space. In the end they will also be able to design and implement IoT circuits and solutions.

Course Outcomes (s):

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

CO#	Course Outcomes
C2110.1	Understand general concepts of Internet of Things
C2110.2	Recognize various devices, sensors and applications
C2110.3	Apply design concept to IoT solutions
C2110.4	Analyze various M2M and IoT architectures
C2110.5	Evaluate design issues in IoT applications
C2110.6	Create IoT solutions using sensors, actuators and Devices

COURSE CONTENT

UNIT - I

Introduction to IoT: Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIs.

UNIT - II

M2M to IoT: The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT,

M2M vs IoT An Architectural Overview: Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. Reference Architecture and Reference Model of IoT.

UNIT - III

IoT Reference Architecture: Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment.

Constraints affecting design in IoT world: Introduction, Technical design Constraints.

UNIT - IV

Domain specific applications of IoT: Home automation, Industry applications, Surveillance applications, Other IoT application.

UNIT - V

Developing IoT solutions: Introduction to Python, Introduction to different IoT tools, Introduction to Arduino and Raspberry Pi Implementation of IoT with Arduino and Raspberry, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IoT in Smart Cities, Privacy and Security Issues in IoT.

TEXT BOOKS:

1. Dieter Uckelmann et.al, Architecting the Internet of Things, Springer, 2011
2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatias Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014
3. Arshdeep Bahga and Vijay Madiseti, Internet of Things A Hand-on Approach, Universities press, 2015.

REFERENCES BOOKS:

1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April 2002
2. Dr. Ovidiu Vermesan and Dr. Peter Friess, Internet of Things: From research and innovation to market deployment, River Publishers 2014.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/106/105/106105166/>

WEB REFERENCE/E-BOOKS:

1. [http://alvarestech.com/temp/smar/Smar/Book2021/Industry4.0/2019/Dimitrios%20Serpanos,Marilyn%20Wolf%20\(auth.\)%20-%20%20Internet-of-Things%20\(IoT\)%20Systems_%20Architectures,%20Algorithms,%20Methodologies-Springer%20International%20Publishing%20\(2018\).pdf](http://alvarestech.com/temp/smar/Smar/Book2021/Industry4.0/2019/Dimitrios%20Serpanos,Marilyn%20Wolf%20(auth.)%20-%20%20Internet-of-Things%20(IoT)%20Systems_%20Architectures,%20Algorithms,%20Methodologies-Springer%20International%20Publishing%20(2018).pdf)

ROBOTICS AND ITS APPLICATIONS
II B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: ROBOTICS AND ITS APPLICATIONS	Course Code: AS20- 66PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Mathematics, Micro processor	

Course Overview:

The course would cover the fundamental concepts and mathematics required to understand, analyze, design and control robotic manipulators for industrial applications or research. As robotics is a very wide field, after taking this course, students could then take more advanced courses/topics in focused areas like, motion planning, AI, unmanned vehicles, etc. Students could use this course to lay the foundation of other courses they teach involving robotics like, manufacturing automation, AI, Computer vision applications, etc.

Course Objective: The objective of this Course is:

- To introduce basic concepts, parts of robots and types of robots
- To make the students familiar with various drive systems of robots, sensors and their applications in programming of robots
- To discuss the applications of robots, and implementations of robots

Course Outcomes(s)

CO#	Course Outcomes
C2110.1	Understand the basic concepts of working of robot
C2110.2	Analyze the function of sensor in robot and design the robotic arm with various tools
C2110.3	Analyze and design to Program the robot for a typical application and path planning using robotic vision
C2110.4	Understand the various robot programming languages
C2110.5	Conduct and design the experiments for various robot operations
C2110.6	Apply and use the advanced techniques for robot processing

COURSE CONTENT (SYLLABUS)

UNIT - I

Introduction: Introduction, brief history, types, classification and usage, science and technology of robots, Artificial Intelligence in Robotics, some useful websites, textbooks and research journals

UNIT - II

Elements of Robots: Joints, Links, Actuators, and Sensors : Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kind of actuators, stepper-DC-servo-and brushless motors, model of a DC servo motor, types of transmissions, purpose of sensor-internal and external sensor, common sensors, encoders-tachometers-strain gauge based force torque sensor, proximity and distance measuring sensors and vision

UNIT - III

End Effectors: Classification of end effectors, tools as end effectors, drive system for grippers, mechanical adhesive, vacuum magnetic, grippers, hooks and scoops, gripper force analysis and gripper design, active and passive grippers

Planning and Navigation: Introduction, path planning, overview, road map path planning-cell decomposition path planning, potential field path planning, obstacle avoidance, case studies

UNIT - IV

Vision system: Robotic vision systems-image representation, object recognition and categorization, depth measurement, image data compression, visual inspection, software considerations

Robot Programming: Introduction to robot languages, VAL, RAPID ,language, basic commands, motion instructions, pick and place operation using industrial robot manual mode, automatic mode, subroutine command based programming, move master command language, introduction, syntax, simple problems

UNIT - V

Field and service robots / Industrial Robots: Ariel robots, collision avoidance robots for agriculture, mining, exploration, underwater, civilian and military applications, nuclear applications, space applications, Industrial robots, artificial intelligence in robots, application of robots in material handling, continuous arc welding, spot welding-spray painting, assembly operation, cleaning,etc

TEXT BOOKS:

1. Richared D.Klafter.Thomas Achmielewski and Mickael Negin, Robotic Engineering an Integrated approach prentice hall India- newdelhi-2001
2. Saeed B.Nikku, Introduction to Robotics, analysis, control and applications Wiley-India 2nd edition-2011

REFERENCE BOOKS:

1. Industrial robotic technology-programming and application by M.P.Groover et al, McGrawhill 2008
2. Robotics technology and flexible automation by S.R. Deb, TMH 2009

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_de11/preview
2. https://onlinecourses.nptel.ac.in/noc19_me74/preview

WEB REFERENCE/E-BOOKS:

1. <https://www.javatpoint.com/robotics-tutorial>
2. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.htm
3. <https://www.toptal.com/robotics/programming-a-robot-an-introductory-tutorial>

**WEB BASED APPLICATIONS DEVELOPMENT
II B.TECH., I SEMESTER
VALUE ADDED COURSE**

Course Title: WEB BASED APPLICATIONS DEVELOPMENT	Course Code: AS20- 72PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

COURSE CONTENT (SYLLABUS)

1. Week 1: Essential HTML topics to develop applications
2. Week 2: Essential CSS Topics to develop applications
3. Week 3: Essential java script to develop applications
4. Week 4: Essential Database manage topics to develop applications
5. Week 5: design the application for “Login authentication”
6. Week 6: develop an application for “Word count”
7. Week 7: develop an application for “Quiz Exam”
8. Week 8: design the Survey form for any company
9. Week 9: develop “Timer/Stop Watch” application
10. Week 10: Build your own Portfolio Website
11. Week 11: Build your college website

**GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)
II B.TECH., I SEMESTER
VALUE ADDED COURSE**

Course Title: GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)	Course Code: AS20-12PW02
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Candidates must have any degree or diploma in Graphic Design. Students must have a wide understanding of Graphic Designing tools. Any certificate in the HTML, Photoshop, CSS or Web Design can act as an added advantage.	

Course Overview: Implement the fundamentals of color: visual, rhythm, and pattern in design · Use scale, weight, direction, texture, and space in a composition.

Course Objective:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

CO#	Course Outcomes
C2110.1	Basic skills using Photoshop software and the peripherals.
C2110.2	Ability to use a range of tools and filters in Photoshop
C2110.3	Ability to print with a variety of techniques and papers.
C2110.4	Creatively solve visual problems.
C2110.5	Evaluate, adjust, refine, and rework solutions.
C2110.6	Use instructor and peer criticism to improve skills and rework solutions.

COURSE CONTENT

UNIT - I

2D Primitives: Elements of pictures created in computer graphics, Graphics input primitives and devices. Drawing primitives in open GL and Basic open GL programming, open GL basic Graphics primitives, Output primitives, Line, Circle and Ellipse drawing algorithms, Attributes of output primitives.

UNIT - II

2D Geometric Transformations: 2D Viewing, Window-Viewport Transformation, Two dimensional Geometric transformations, Line, Polygon, Curve and Text clipping algorithms.

UNIT - III

3D Concepts: Projections, Three dimensional object representation, Parallel and Perspective Polygons, 69 Splines, Quadric Surfaces, Visualization of data sets, 3D affine transformations 3D Rotations using Quaternions, Viewing, Visible surface identification, Color Models, 3D Transformations in open GL

UNIT - IV

Multimedia Basics: Introduction and definitions, applications, elements, Animations, Compression, Types of Compressions: Lossless, Loss, Video compression, Image Compression, Audio compression, Data and file format standards, Multimedia data structures: KD Trees ,R trees.

UNIT V

Multimedia Authoring And Applications: Creating interactive multimedia, Multimedia Authoring Systems, Multimedia Authoring Software Applications, Video On demand ,Virtual Reality , Augmented Reality , Content based retrieval in digital libraries.

TEXT BOOKS:

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, “Computer Graphics with Open GL”, Fourth Edition, Pearson Education, 2010.
2. Ze-Nian Li and Mark S.Drew, “Fundamentals of Multimedia”, First Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. F.S.Hill, “Computer Graphics using OPENGL”, Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, “Multimedia systems design”, First Edition, PHI, 2007.

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/112/102/112102101/>
2. <https://nptel.ac.in/courses/107/101/107101001/>

WEB REFERENCE/E-BOOKS:

1. <http://ptgmedia.pearsoncmg.com/images/9780321827333/samplepages/0321827333.pdf>
2. <http://myy.haaga-helia.fi/~woljo/photoshop/an-introduction-to-adobe-photoshop.pdf>
3. https://cdn.billiger.com/dynimg/pu0dDTvLOQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4_1H_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf
4. <https://www.enraversnetwork.com/files/CorelDRAW-X7-Training.pdf>
5. <https://ptgmedia.pearsoncmg.com/images/9780672336997/samplepages/0672336995.pdf>

**PROJECT BASED LEARNING USING C++
II B.TECH., I SEMESTER
VALUE ADDED COURSE**

Course Title: PROJECT BASED LEARNING USING C++	Course Code: AS20-05PW02
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

Course Overview:

This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development, and coding and testing using a modern software development environment. Students learn how to write programs in an object-oriented high level programming language. Students will be equipped with fundamental programming, Arrays, Functions, Exception, class, objects, etc.

Course Objective: The objective of this Course is:

- Understand and use the basic programming constructs of C++
- Manipulate various C++ data types, such as arrays, strings, and pointers
- Isolate and fix common errors in C++ programs
- Use memory appropriately, including proper allocation/deallocation procedures
- Apply object-oriented approaches to software problems in C++

Course Outcomes(s)

CO#	Course Outcomes
C2110.1	Understand the Basics of object and class in C++.
C2110.2	Understand the Basic concept of Object Orientation, object identity and Encapsulation.
C2110.3	Analyze the given problem statements to create basic program designs.
C2110.4	Implement different functions for input and output, various data types, basic operators, files and functions.
C2110.5	Implement programming techniques to solve problems in the C++ programming language
C2110.6	Apply the concepts and principles of the programming language to the real-world problems and solve the problems through project-based learning.

COURSE CONTENT (SYLLABUS)

- Week 1: Login and Registration System
- Week 2: Car Rental System.
- Week 3: Bookshop inventory system.
- Week 4: Student Report Management System.
- Week 5: Sudoku Game.
- Week 6: Using Graphics to Draw and Move Shapes
- Week 7: Customer Billing System
- Week 8: Phonebook Application
- Week 9: Snake Game.
- Week 10: Payroll Management System

TEXT BOOK:

1. Reeta Sahoo, C++ Projects- Khanna Book Publication

REFERENCE BOOKS:

2. Stanley Lippman, Josée Lajoie, Barbara Moo, C++ Primer-Fifth edition
3. Bruce Eckel, Thinking in C++: Introduction to Standard C++-Second Edition

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
2. https://onlinecourses.nptel.ac.in/noc19_cs38/preview
3. https://onlinecourses.nptel.ac.in/noc21_cs02/preview

WEB REFERENCE/E-BOOKS:

1. <https://www.javatpoint.com/cpp-tutorial>
2. <https://www.tutorialspoint.com/cplusplus/index.htm>
3. <https://www.cplusplus.com/doc/tutorial/>
4. <https://www.learncpp.com/>

**B.Tech.,
SECOND YEAR
SEOND SEMESTER
SYLLABUS**

**PROBABILITY AND RANDOM PROCESS
II B.TECH., II SEMESTER**

Course Title: PROBABILITY AND RANDOM PROCESS	Course Code: AS20-00BS10
Teaching Scheme (L:T:P)3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:

- Basic concepts of probability and Random Variables
- Discrete probability distributions like Binomial, Poisson and their properties etc.
- Continuous Probability distributions like Normal, Gamma, and Exponential distributions.
- Concept of fitting of straight line, parabola and other curves
- The testing of hypothesis and large sample procedures

Course Objective

- The ideas of probability and random variables
- The various discrete probability distributions and their properties.
- The various continuous probability distributions and their properties.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- The statistical methods of studying data samples and identify the Samples to make decisions for samples given.

Course Outcomes(s)

CO#	Course Outcomes
C221.1	Formulate and solve problems involving random variables
C221.2	Apply statistical methods for analysing experimental data by probability distributions
C221.3	Identify Various discrete and continuous probability distributions and their properties
C221.4	Evaluation of regression and correlation
C221.5	Analyze the statistical methods of studying data samples
C221.6	Analyze to make important decisions for few samples which are taken from a larger data.

COURSE CONTENT

UNIT - I

Random Variables: Introduction to Basic Probability, Random variables: Discrete Random Variable, Continuous Random variables, Expectation of Random Variables: Variance of Random variables, Moments.

UNIT – II

Discrete Probability Distributions: Binomial Distributions, Poisson Distributions, Evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

UNIT – III

Continuous Random Variable & Distributions: Continuous random variables and their properties, Distribution functions and densities, Normal Distributions, Exponential

Distributions, Gamma Distributions, Evaluation of statistical parameters for these distributions.

UNIT – IV

Applied Statistics: Curve fitting by the method of least squares: fitting of straight-line, Second-degree parabola and more general curves, Correlation and regression: Rank correlation.

UNIT – V

Testing Of Hypothesis: Test of significance: Null Hypothesis, Alternative Hypothesis-Type I Error –Type II Error, Large sample test for single proportion, Difference of proportions, Single mean: Difference of means, Test for single mean, Difference of means for small samples, Test for ratio of variances for small samples.

TEXT BOOKS:

1. S C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Khanna Publications
2. S.R.K. Iyengar, R.K Jain Advanced engineering Mathematics ,Narosa publishing house, Fifth Edition,2016.

REFERENCES BOOKS:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. Sheldon Ross, A First Course in Probability, 9th Edition, Pearson Education India.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.my-mooc.com/en/categorie/statistics-and-probability>
2. <https://www.khanacademy.org/math/statistics-probability>

WEB REFERENCE/E-BOOKS:

1. Fundamentals Of Mathematical Statistics By S.C.Guptha, V.K Kapoor
2. Probability And Statistics For Engineers By Miller & Freund's

DATABASE SYSTEMS

II B.Tech II SEM

Course Title: DATABASE SYSTEMS	Course Code: AS20-72PC04
Teaching Scheme (L: T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:

This course will deliver the knowledge in introducing the concepts of database and how to interact with the database using SQL and PL/SQL

Course Objective:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

COURSE CONTENT

UNIT – I:

Introduction to Databases, History of Database Systems, Types of Databases, Applications of Databases, Database, Purpose of Database Systems, View of Data

RELATIONAL MODEL BASICS: Attributes, Schemas, Tuples, Domains, Equivalent Representation of a Relations, Relation Instances, Keys of Relations

UNIT – II:

DATA BASE DESIGN: introduction, entity types, ER Diagrams, Entities, Attributes and Entity sets, weak Entities, keys, constraints, relationship sets, Schema architecture, queries, database languages, queries, Constrains

UNIT – III:

SQL: introduction to SQL, Data Definition Language(DDL)- Create, Drop, Alter, Truncate, Rename, Data Manipulation Language (DML)-Insert, Update, Delete, Data Query Language (DQL)-Select, Data Control Language (DCL)-Grant, Revoke, Transaction Control Language (TCL)-Commit, Rollback, Savepoint, Views, Indexes, Assertions

UNIT – IV:

RELATIONAL ALGEBRA & CALCULUS: Algebra introduction, Set operations on relations, Projection, Selection, Cartesian Product, Joins, Division, Tuple Relational Calculus - The Domain Relational Calculus

NORMALIZATION Functional dependencies, anomalies, Decomposition, 1NF 2NF, 3NF, BCNF, 4NF, 5NF; Multi-valued Dependencies

UNIT – V:

PL/SQL: Introduction, Benefits of PL/SQL, PL/SQL architecture, Data types, Variables and constants, Operators, conditional and unconditional statements -Simple if, if... else, nested if..Else, if..else Ladder, Selection Case, Simple Case, GOTO Label and EXIT, iterations- Simple loops, While Loops, For Loops and Nested Loops, Functions, procedures, cursors & Triggers.

TEXT BOOKS:

1. Database Systems, The Complete Book by Hector Garcia-Molina Jeffrey D. Ullman Jennifer Widom, Second Edition.
2. Fundamentals of Database Systems, RamezElmasri and Navathe Pearson Education, 6th edition
3. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGrawHill Education (India) Private Limited, 3rdEdition.

REFERENCE BOOK:

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
3. Database System Concepts, Silberschatz, Korth, McGraw hill, 5th edition.

PROGRAMMING ESSENTIALS USING PYTHON
II B.TECH., II SEMESTER

Course Title: PROGRAMMING ESSENTIALS USING PYTHON	Course Code: AS20-12PC02
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming and Problem Solving, Data Structures	

Course Overview: Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming, and graphical user interface-driven applications. The examples and problems used in this course are drawn from diverse areas such as text processing, simple graphics creation and image manipulation, HTML and web programming, and genomics

Course Objective

- To know the basics of Core Programming including data types, control structures, algorithm development, and program design with functions.
- To understand the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To solve problems, explore real-world software development challenges, and create practical and contemporary applications.

Course Outcomes(s)

CO#	Course Outcomes
C223.1	Explain various operators used in python.
C223.2	Apply the string handling functions to solve the given problem.
C223.3	Describe Object oriented concepts with python.
C223.4	Use image processing techniques in python programming to solve a given problem.
C223.5	Discuss the functions of networking in python.
C223.6	Demonstrate significant experience with the Python program development environment.

COURSE CONTENT

UNIT - I

Introduction:

Installing Python; basic syntax, interactive shell, editing, saving, and running a script variable, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

UNIT - II

CONDITIONAL STATEMENT & STRINGHANDLING

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation. Arrays: Declaration, Initialization of Arrays,

Accessing of Arrays. String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hex decimal numbers.

UNIT - III

FUNCTIONS

Functions: Introduction, Defining and Calling a Void Function, designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions-Generating Random Numbers, the math Module, Storing Functions in Modules. Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

UNIT - IV

OBJECT ORIENTED PROGRAMMING WITH PYTHON

Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent to range of objects–OOP, continued: inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block.

UNIT - V

DATA STRUCTURES

List-operations, Indexing, Slicing, Methods; Tuples, operations, Indexing, Slicing, Methods Dictionaries, operations, Indexing, Slicing, Methods; Sets, sequences, In- Built functions.

Sorting Techniques: Insertion sort, Bubble Sort, Selection Sort

TEXT BOOKS:

1. Learning Python: Powerful Object-Oriented Programming: 5th Edition Shroff; Fifth edition (24 July 2013)
2. Guido van Rossum and Fred L. Drake Jr., "An Introduction to Python—Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES BOOKS:

1. Python Essential Reference. Addison-Wesley Professional; 4TH edition (July 19, 2009) by David M. Baezly.
2. "Python Cookbook" O'Reilly Media; 3 Edition (June 1, 2013) by David M. Baezly.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/python>
2. <https://www.edx.org/python>

**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
II B.TECH., II SEMESTER**

Course Title: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	Course Code: AS20-05PC02
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Data Structures	

Course Overview:

The Course provides Introduction to the formal mathematical concepts of computer science for the beginning student. Topics include elementary logic, induction, algorithmic processes, graph theory and models of computation.

Course Objective

- To introduce the concepts of mathematical logic.
- To introduce the concepts of sets, relations, and functions.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To introduce generating functions and recurrence relations.

Course Outcomes(s)

CO#	Course Outcomes
C224.1	Applies mathematical logic to solve problems.
C224.2	Explains sets, relations, functions, and discrete structures.
C224.3	Explains the use of logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
C224.4	Formulates problems and solve recurrence relations.
C224.5	Models and generates the function
C224.6	Explain the use of Graph Theory for solving problems.

COURSE CONTENT

UNIT – I

MATHEMATICAL LOGIC: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT – II

SET THEORY: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

ALGEBRAIC STRUCTURES: Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

UNIT – III

ELEMENTARY COMBINATORICS: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with

Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion Exclusion.

UNIT – IV

RECURRENCE RELATIONS: Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, solving recurrence relations by substitution and Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT – V

GRAPHS: Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed.

REFERENCES BOOKS:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics, D.S. Malik & M.K. Sen, Revised edition Cengage Learning.
3. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/111/107/111107058/>

**DIGITAL ELECTRONICS
II B.TECH., II SEMESTER**

Course Title: DIGITAL ELECTRONICS	Course Code:AS20-04ES06
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: EDC	

Course Overview:

To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

Course Objective

- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyse sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

Course Outcomes(s)

CO#	Course Outcomes
C225.1	Explain working of different logic families and logic gates.
C225.2	Solve Boolean expressions to minimize various combinational functions.
C225.3	Design and implement various Combinational logic circuits.
C225.4	Analyze and design various sequential circuits.
C225.5	Explain the process of Analog to Digital conversion and Digital to Analog conversion.
C225.6	Develop the given logical problem using PLD's

COURSE CONTENT

UNIT - I

Fundamentals of Digital Systems and Logic Families: Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

UNIT - II

Combinational Digital Circuits: Standard representation for logic functions, K-map representation, and simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial ladder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

UNIT - III

Sequential Circuits and Systems: A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J, K, T and D types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

UNIT - IV

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

UNIT - V

Semiconductor Memories and Programmable Logic Devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

TEXT BOOKS:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCES BOOKS:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

WEB REFERENCE/E-BOOKS:

1. <https://doi.org/10.1515/9783110263787.73>

**PYTHON PROGRAMMING LAB
II B.TECH., II SEMESTER**

Course Title: PYTHON PROGRAMMING LAB	Course Code: AS20-12PC04
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming	

Course Overview:

Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements.

Course Objective

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcomes(s)

CO#	Course Outcomes
C226.1	Study the basic concepts scripting and the contributions of scripting language.
C226.2	Demonstrate proficiency in handling Strings and File Systems.
C226.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C226.4	Explore python especially the object oriented concepts, and the built in objects of Python.
C226.5	Create practical and contemporary applications such as TCP/IP network programming.
C226.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

COURSE CONTENT

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”.
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: $c/5 = f-32/9$] .
10. Write a Python program to construct the following pattern, using a nested for loop

*
* *

```
* * *
* * * *
* * * * *
* * * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the secondfile.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement $\text{pow}(x, n)$.
20. Write a Python class to reverse a string word by word.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCES BOOKS:

1. Dive into Python, Mike.
2. Learning Python, 4th Edition by Mark Lutz.
3. Programming Python, 4th Edition by Mark Lutz.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/python>
2. <https://www.edx.org/python>

WEB REFERENCE/E-BOOKS:

1. <http://www.w3schools.com>
2. <http://docs.python.org>
3. <http://www.tutorialspoint.com>
4. <http://www.learnpython.org>

DATABASE SYSTEMS LAB
II B.Tech., II SEM

Course Title: DATABASE SYSTEMS LAB	Course Code: AS20-72PC05
Teaching Scheme (L: T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Data Structures Lab	

Course Overview:

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

Course Objective

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues

LIST OF EXPERIMENTS:

Experiment 1: Draw the ER Diagram for College Database

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc. Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Experiment 2: Concept design with E-R Model for College Database

Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

Experiment 3: Relational Model for College Database

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Experiment 4: Installation of Oracle/Mysql and practicing DDL commands. In this week student will learn Creating databases, how to create tables, altering the database, dropping tables and databases, truncate, rename commands etc.

Experiment 5: Practicing following DML commands –

SELECT – retrieve data from the a database

INSERT – insert data into a table

UPDATE – updates existing data within a table

DELETE – deletes all records from a table, the space for the records remain

Experiment 6: Practicing DCL commands -Grant, Revoke, TCL commands-Commit, Rollback.

Experiment 7: Querying

In this experiment students will practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Experiment 8: Querying

In this experiment students will practice queries (along with sub queries) using Aggregate Functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING.

Experiment 9: Working with Conversion Functions & String Functions Queries using Conversion Functions (TO_CHAR, TO_NUMBER AND TO_DATE), String Functions (CONCATENATION, LPAD, RPAD, LTRIM, RTRIM, LOWER, UPPER, INITCAP, LENGTH, SUBSTR AND INSTR), Date Functions (SYSDATE, NEXT_DAY, ADD_MONTHS, LAST_DAY, MONTHS_BETWEEN), LEAST, GREATEST, TRUNC, ROUND, TO_CHAR, TO_DATE.

Experiment 10: Write a Queries on Views- CREATE, UPDATE, RENAME, DROP

Experiment 11: a) Write a PL/SQL program to find factorial of a given number

b) Write a PL/SQL program to print Fibonacci Series

Experiment 12: Write a PL/SQL program to implement procedures, Cursors and Triggers.

TEXT BOOK(S) :

1. Oracle PL/SQL by Example, Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Ed
2. Oracle Database Logic PL/SQL Programming, Scott Urman, Tata Mc-Graw Hill.
3. SQL and PL/SQL for Oracle 10g, Black Book, Dr .P.S. Deshpande

**DIGITAL ELECTRONICS LAB
II B.TECH., II SEMESTER**

Course Title: DIGITAL ELECTRONICS LAB	Course Code: AS20-04ES07
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Digital Electronics and EDC	

Course Overview:

To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

Course Objective

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyse sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

Course Outcomes(s)

CO#	Course Outcomes
C218.1	Identify the various digital ICs and understand their operation.
C218.2	Understand the basic logic gates and to verify their operation
C218.3	Construct basic combinational circuits and verify their functionalities
C218.4	Apply the design procedures to design basic sequential circuits
C218.5	Verify truth tables and excitation tables of various flip flops
C218.6	Understand working of Logic families

COURSE CONTENT

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Generation of clock using NAND / NOR gates
4. Design a 4 – bit Adder / Subtractor
5. Design and realization a 4 – bit gray to Binary and Binary to Gray Converter
6. Design and realization of a 4 bit pseudo random sequence generator using logic gates.
7. Design and realization of an 8 bit parallel load and serial out shift register using flip-flops.
8. Design and realization a Synchronous and Asynchronous counters using flip-flops
9. Design and realization of Asynchronous counters using flip-flops
10. Design and realization 8x1 using 2x1 mux
11. Design and realization 2 bit comparator
12. Verification of truth tables and excitation tables
13. Realization of logic gates using DTL, TTL, ECL, etc.,
14. State machines

TEXT BOOKS:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCES BOOKS:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

WEB REFERENCE/E-BOOKS:

1. <https://doi.org/10.1515/9783110263787.73>

**GENDER SENSATIZATION
II B.TECH., II SEMESTER
MANDATORY COURSE**

Course Title: GENDER SENSATIZATION	Course Code: AS20-00MC02
Teaching Scheme (L:T:P):3:0:0	Credits: 0
Type of Course: Lecture + Assignment	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks
Prerequisites: Gender vs Sex, Gender in contemporary India, Gender discrimination works in our society, Men and women live together as equals, Build up a sense of appreciation of women	

Course Overview:

This course is designed to understand the issues related to Gender and how Gender discrimination impacts in our society and how to encounter them. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Course Objective

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes(s)

CO#	Course Outcomes
C219.1	Develop a better understanding of important issues related to gender in contemporary India.
C219.2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C219.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.
C219.4	Acquire insight into the gendered division of labor and its relation to politics and economics.
C219.5	Men and women students and professionals will be better equipped to work and live together as equals.
C219.6	Build up a sense of appreciation of women in all walks of life.

COURSE CONTENT

UNIT – I

Understanding Gender: Introduction

What is Gender and why does it matter?

Gender Relations and Status in the Household

Masculinities

Gender Analysis and mainstreaming

Gender: Why Should We Study It? (*Towards a World of Equals: Unit -1*)

Socialization: Making Women, Making Men (*Towards a World of Equals: Unit – 2* Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT – II

Gender and Biology:

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals: Unit -4*), Declining sex ratio. Demographic Consequences.

Teacher's Role in Promoting/Advancing Gender Sensitization
STRATEGIES / MEASURES TO PROMOTE GENDER SENSITIZATION

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

UNIT – III

Gender and Labour:

Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

Sexual Harassment—Women at all levels of employment and all levels of workplace are affected.

UNIT - IV

Issues Of Violence

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “*Chupulu*”.

Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Promoting gender equality to prevent violence against women

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life....” - Additional Reading: The Caste Face of Violence.

UNIT – V

Gender: Co – Existence

The Value of Coexistence, Passive coexistence, Active coexistence

Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK:

1. Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu “**Towards a World of Equals: A Bilingual Textbook on Gender**” published by Telugu Akademi, Hyderabad, Telangana State, 2015.

REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdul ali Sohaila. “**I Fought For My Life...and Won.**” Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdul/>

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/110/105/110105080/>
2. <https://nptel.ac.in/courses/109/103/109103122/>

WEB REFERENCE/E-BOOKS:

1. <http://www.mcrhrdi.gov.in/adr%202016/presentations/Gender%20Sensitisation%20For%20FCs.pdf>
2. <https://mangaloreuniversity.ac.in/sites/default/files/2019/Course%20-%206%20Gender%20School%20&%20Society%20-%20English%20Version.pdf>
3. <http://ncw.nic.in/notice/gender-sensitization-module-gender-sensitization-and-legal-awareness-programme-collaboration>

**INNOVATIVE PROJECT DEVELOPMENT
II B.TECH., II SEMESTER
VALUE ADDED COURSE**

Course Title: INNOVATIVE PROJECT DEVELOPMENT	Course Code: AS20-05PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: C Programming	

Course Overview:

Design Thinking is Human-centered problem-solving tool which emphasize on Empathy, Collaboration, Co- creation and Stakeholder feedback to unlock Creativity and Innovation, which devises feasible and viable Big Idea/solutions. The key to the process is empathizing with the users (citizen) to uncover unmet needs by understanding their beliefs, values, motivations, behaviors, pains, gains and challenges and to provide innovative solution concepts

Course Objective: The objective of this Course is:

- Equip the students to work on real projects by designing needs and solutions with communities (users/citizen)
- To deeply understand the people they're looking to serve, to dream up scores of ideas, and to create innovative new solutions rooted in people's actual needs using Design Thinking
- To develop innovative solutions through step-by-step guide with samples and ready to use templates.

CO#	Course Outcomes
C2210.1	Understands basic phases of Design Thinking
C2210.2	Describes Exploratory research methods
C2210.3	Analyzes using concept maps for various projects
C2210.4	Understands the process of Ideation
C2210.5	Develops prototypes for various projects
C2210.6	Applies Design Thinking for developing innovative projects

COURSE CONTENT (SYLLABUS)

UNIT - I

Why Innovate: What is Design Thinking, But is it only designers, who think this way? Why Design Thinking?

UNIT - II

Immersion: Preliminary immersion – Reframing, Exploratory Research, Desk Research, In-Depth immersion, Interviews, Cultural Probes, Generative sessions, A Day in the Life, Shadowing

UNIT - III

Analysis And Synthesis: Insight Cards, Affinity Diagram, Conceptual Map, Guiding Criteria, Personas, Empathy Map, User's Journey, Blueprint

UNIT - IV

Ideation: Brainstorming, Co-creation workshop, Idea Menu, Decision Matrix

UNIT - V

Prototyping: Paper Prototyping, Volumetric Model, Staging, Storyboard, Service Prototyping

TEXT BOOKS

1. Maurício Vianna, Ysmar Vianna, Design Thinking – Business Innovation, MJV Press
2. Moritz Gekeler, A practical guide to design thinking

REFERENCE BOOKS

1. The Brown Book Of Design Thinking, J. Berengueres, UAE University College
2. The Design Thinking Handbook by Eli Wooleri

**VIRTUAL REALITY
II B.TECH., II SEMESTER
VALUE ADDED COURSE**

Course Title: VIRTUAL REALITY	Course Code: AS20-66PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Mathematics, Engineering Graphics	

Course Overview:

This course will introduce you to Virtual Reality (VR). The course will teach you everything from the basics of VR- the hardware and the history of VR- to different applications of VR, the psychology of Virtual Reality, and the challenges of the medium. A learner with no previous experience in Virtual Reality and/or game programming will be able to evaluate existing VR applications, and design, test, and implement their own VR experiences/games using Unity by the end of the specialisation.

Course Objective: The objective of this Course is:

- Familiarize with fundamentals of Virtual Reality.
- Deal with the behaviour of light in lenses and human vision.
- Facilitate preliminaries of visual perception on spectrum of light and visual rendering.
- Impart the knowledge of tracking 2D and 3D orientation.
- Demonstrate the physics of sound and use of Haptic.
- Familiarize with evaluation of Virtual Reality Systems.

Course Outcomes(s)

CO#	Course Outcomes
C2210.1	Understand goals of VR and the geometry involved in Virtual world.
C2210.2	Understand optical aberrations of light and relates the Cornea of human eye to Photoreceptors which implies the eye movement.
C2210.3	Identify depth, motion, colour of Visual perception and use it for Visual rendering.
C2210.4	Apply knowledge of tracking 2D and 3D orientation for tracking position and orientation of the attached bodies.
C2210.5	Understand perception and rendering of audio system in Virtual Reality and analyse the haptic devices and interfaces.
C2210.6	Understand perceptual training and evaluate experiments on Human subjects related to VR Systems.

COURSE CONTENT

UNIT - I

VIRTUAL REALITY AND VIRTUAL ENVIRONMENTS: The historical development of VR: Scientific landmarks Computer Graphics, Real-time computer graphics, Flight simulation, Virtual environments, Requirements for VR, benefits of Virtual reality.

HARDWARE TECHNOLOGIES FOR 3D USER INTERFACES: Visual Displays Auditory Displays, Haptic Displays, Choosing Output Devices for 3D User Interfaces.

UNIT - II

3D USER INTERFACE INPUT HARDWARE: Input device characteristics, Desktop input devices, Tracking Devices, 3D Mice, Special Purpose Input Devices, Direct Human Input, Home - Brewed Input Devices, Choosing Input Devices for 3D Interfaces.

UNIT - III

SOFTWARE TECHNOLOGIES: Database - World Space, World Coordinate, World Environment, Objects - Geometry, Position / Orientation, Hierarchy, Bounding Volume, Scripts and other attributes, VR Environment - VR Database, Tessellated Data, LODs, Cullers and Occludes, Lights and Cameras, Scripts, Interaction - Simple, Feedback, Graphical User

Interface, Control Panel, 2D Controls, Hardware Controls, Room / Stage / Area Descriptions, World Authoring and Playback, VR toolkits, Available software in the market

UNIT - IV

3D INTERACTION TECHNIQUES: 3D Manipulation tasks, Manipulation Techniques and Input Devices, Interaction Techniques for 3D Manipulation, Design Guidelines - 3D Travel Tasks, Travel Techniques, Design Guidelines - Theoretical Foundations of Wayfinding, User Centered Wayfinding Support, Environment Centered Wayfinding Support, Evaluating Wayfinding Aids, Design Guidelines - System Control, Classification, Graphical Menus, Voice Commands, Gestural Commands, Tools, Multimodal System Control Techniques, Design Guidelines, Case Study: Mixing System Control Methods, Symbolic Input Tasks, symbolic Input Techniques, Design Guidelines, Beyond Text and Number entry .

DESIGNING AND DEVELOPING 3D USER INTERFACES: Strategies for Designing and Developing Guidelines and Evaluation.

VIRTUAL REALITY APPLICATIONS: Engineering, Architecture, Education, Medicine, Entertainment, Science, Training.

UNIT - V

Augmented and Mixed Reality: Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments, evaluating AR systems.

TEXT BOOKS:

1. Alan B Craig, William R Sherman and Jeffrey D Will, “Developing Virtual Reality Applications: Foundations of Effective Design”, Morgan Kaufmann, 2009.
2. Gerard Jounghyun Kim, “Designing Virtual Systems: The Structured Approach”, 2005.
3. Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, “3D User Interfaces, Theory and Practice”, Addison Wesley, USA, 2005.

REFERENCE BOOKS:

1. Oliver Bimber and Ramesh Raskar, “Spatial Augmented Reality: Merging Real and Virtual Worlds”, 2005.
2. Burdea, Grigore C and Philippe Coiffet, “Virtual Reality Technology”, Wiley Interscience, India, 2003.
3. John Vince, “Virtual Reality Systems”, Addison Wesley, 1995.
4. Howard Rheingold, “Virtual Reality: The Revolutionary Technology and how it Promises to Transform Society”, Simon and Schuster, 1991.
5. William R Sherman and Alan B Craig, “Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)”. Morgan Kaufmann Publishers, San Francisco, CA, 2002
6. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/121106013/>
2. <https://nptel.ac.in/syllabus/106106138/>

WEB REFERENCE/E-BOOKS:

1. <https://hackr.io/tutorials/learn-virtual-reality>
2. <https://tutorials.one/virtual-reality/>

**ANDROID APP DEVELOPMENT
II B.TECH., II SEMESTER
VALUE ADDED COURSE**

Course Title: ANDROID APP DEVELOPMENT	Course Code: AS20-05PW04
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: JAVA Programming	

Course Overview:

Android Development is one of the trending domains of programming as it holds the majority market of today. The key to becoming a successful Android app developer is getting the fundamentals right. The course will help you in utilizing the right tools and technologies to build user-friendly applications from scratch, easily. Learn the core concepts of styles, menu, intents, activities and testing with the advanced database and libraries. You'll learn how to effectively cooperate with the lifecycle of Android activities.

Course Objective:

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improve their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Course Outcomes(s)

CO#	Course Outcomes
C2210.1	Understands Android Application Development Framework and The Various Types of Android Applications
C2210.2	Understands Android Application Lifecycle
C2210.3	Describes The Various User Interface Layouts
C2210.4	Develops Programs for Communication Through Android Applications
C2210.5	Develops Programs for Accessing Files Through Android Application
C2210.6	Develops Various Android Applications

COURSE CONTENT (SYLLABUS)

UNIT - I

Introduction to Android Operating System: Android OS design and Features :Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

UNIT - II

Android application components: Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

Android Application Lifecycle: Activities, Activity lifecycle, activity states, monitoring state changes

UNIT – III

Android User Interface: Measurements, Device and pixel density independent measuring
Layouts : Linear, Relative, Grid and Table Layouts
User Interface (UI) Components : Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
Event Handling : Handling clicks or changes of various UI components
Fragments: Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT - IV

Intents and Broadcasts: Intent, Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers: Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity
Notifications: Creating and Displaying notifications, Displaying Toasts

UNIT - V

Persistent Storage: Files, Using application specific folders and files, creating files, reading data from files, listing contents of a directory

Shared Preferences: Creating shared preferences, saving and retrieving data using Shared Preference

TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOK:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. Android app using Kotlin - By Prof Kannan Moudgalya - Principal Investigator of Spoken Tutorial Project, Indian Institute of Technology Bombay
2. Modern Application Development
By Prof. Aamod Sane, Prof. Abhijat Vichare, Prof. Madhavan Mukund, Persistent Computing Institute, Persistent Computing Institute, Chennai Mathematical Institute

WEB REFERENCE/E-BOOKS:

1. <https://endangcahyapermana.files.wordpress.com/2016/05/android-application-development-for-for-dummies.pdf>
2. http://yuliana.lecturer.pens.ac.id/Android/Buku/professional_android_4_application_development.pdf
3. <https://www.mediapiac.com/uploads/conference/presenters/documents/17/8.pdf>
4. <http://projanco.com/Library/Android%20App%20Development%20in%20Android%20Studio%20-%20Java%20plus%20Android%20edition%20for%20beginners.pdf>

INTRODUCTION TO MATLAB AND ITS APPLICATIONS
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: INTRODUCTION TO MATLAB	Course Code: AS20-04PW05
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Linear Algebra and Signals & Systems, Engineering Graphics	

Course Overview:

This course deals with the concept of MATLAB Software and writing simple programs in MATLAB.

Course Objective: The objective of this Course is:

- To create awareness to students about MATLAB software environment.
- Students will understand the basics of MATLAB software and its data class.
- To enable the students to learn basic MATLAB programming for engineering application.
- MATLAB Simulink for simulation, analysis and design of the system.

Course Outcomes(s)

CO#	Course Outcomes
C2210.1	Understand the fundamentals to simulation software
C2210.2	Understand the matrices and arrays in MATLAB
C2210.3	Understand the working of matrices and expression in MATLAB
C2210.4	Understand the Common windows and graphics working in MATLAB
C2210.5	Understand the Flow control and Data structure handling in MATLAB
C2210.6	Understand the Scripting and function availability in MATLAB

COURSE CONTENT (SYLLABUS)

UNIT - I

Introduction To Simulation Software: About MATLAB, MATLAB System, how to start MATLAB

Matrices And Arrays: Entering Matrices sum and transpose, subscripts, Colon Operator, magic Function, Variables and constants: Definition, naming (identifiers or labels for different entities), initialization and accessing of variables. Constants and their representation.

UNIT - II

Working With Matrices: Generating Matrices, the load Function, M-Files, Concatenation, Deleting Rows and Columns, Linear Algebra, Arrays Multivariate Data, Scalar Expansion, Logical Subscripting, find Function.

Expressions: Variables, Numbers, Operators, Functions, Expressions.

UNIT - III

Command Window: The format Function, Suppressing Output, Entering Long Statements, Command Line Editing.

Graphics: Plotting Process, Editing Process, Preparing Graphs, Basic Plotting Functions, Mesh & Surface Plot, and Image Reading & Writing, Printing graphics, Simple programs.

UNIT - IV

Flow Control: If, else, and else if, switch and case, for, while, continue, break try - catch, return.

Other Data Structures: Multidimensional Arrays, Cell Arrays, Characters and Text, Structures, Simple programs.

UNIT - V

Scripts & Functions: Scripts, Functions, Global Variables, Passing String Arguments to Functions, eval Function, Function Handles, Vectorization, Pre allocation, Simple programs.

TEXT BOOKS:

1. MATLAB & Its Applications in Engineering By: Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma
2. A Guide to MATLAB: For Beginners & Experienced Users By: Kevin R. Coombes, John E. Osborn, Garrett J. Stuck

REFERENCE BOOKS:

1. Learning to Program with MATLAB: Building GUI Tools 1st Edition by Craig S. Lent

RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://matlabacademy.mathworks.com/>
2. <https://www.coursera.org/learn/matlab>
3. https://onlinecourses.nptel.ac.in/noc20_ge05/preview

WEB REFERENCE/E-BOOKS:

1. <http://www.freebookcentre.net/Language/Matlab-Books.html>
2. http://www.mathworks.com/help/releases/R2014b/pdf_doc/matlab/getstart.pdf
3. <https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf>
4. <https://ocw.mit.edu/resources/res-18-002-introduction-to-matlab-spring-2008/>

PROJECT BASED LEARNING USING PYTHON
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: PROJECT BASED LEARNING USING PYTHON	Course Code: AS20-72PW02
Teaching Scheme (L: T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

COURSE CONTENT (SYLLABUS)

1. Develop word count application with python
2. Develop GUI application for calendar with python
3. Convert Image to a Pencil Sketch using Python
4. Develop GUI application for Countdown Timer/ Alarm with python
5. Password Generator with python
6. Quiz Application
7. Develop GUI application for converter (1. Currency, 2. Length, 3. Area)
8. Python Snake Game
9. Sudoku Solver
10. Develop application to convert text to speech
11. create your own QR codes and encode/decode with python

**B.Tech.,
THIRD YEAR First
SEMESTER
SYLLABUS**

**BIG DATA TECHNOLOGIES
III B.TECH., I SEMESTER**

Course Title: BIG DATA TECHNOLOGIES	Course Code:AS20-72PC06
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: :A Course on“ Database systems”, ”Data structures”	

Course Objective

To learn the big data characteristics, study challenges and Hadoop framework to handle big data.

Course Outcomes(s)

CO#	Course Outcomes
C311.1	Understand the elements of Big data
C311.2	Use different technologies to tame Big Data
C311.3	Process Given data using Map Reduce
C311.4	Develop applications using Hive, NoSQL.
C311.5	YARN to develop application in YARN
C311.6	HBase to develop application in HBase

COURSE CONTENT(SYLLABUS)

UNIT- I

Getting an Overview of Big Data: Introduction to Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics. Exploring the use of Big Data in Business Context Use of Big Data in Social Networking, Use of Big Data Preventing Fraudulent Activities, Use of Big Data in Retail Industry

UNIT- II

Introducing Technologies for Handling Big Data Distributed and Parallel Computing for Big Data, Introducing Hadoop, Cloud Computing and Big Data, In-memory Computing Technology for Big Data.

Understanding Hadoop Ecosystem Hadoop Ecosystem, Hadoop Distributed File System, Map Reduce, Hadoop YARN, Introducing HBase, Combining HBase and HDFS, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume,Oozie.

UNIT- III

Understanding Map Reduce Fundamentals and H Base The Map Reduce Framework, Techniques to Optimize Map Reduce Jobs, Uses of Map Reduce, Role of H Base in Big Data Processing.

Processing Your Data with Map Reduce Recollecting he Concept of Map Reduce Framework, Developing Simple Map Reduce Application, Points to Consider while Designing Map Reduce.

UNIT- IV

Customizing Map Reduce Execution and Implementing Map Reduce Program Controlling Map Reduce Execution with Input Format, Reading Data with Custom Record Reader, Organizing Output Data with Output Formats, Customizing Data with Record Writer, Customizing the Map Reduce Execution in Terms of YARN, Implementing a Map Reduce Program for Sorting Text Data.

Testing and Debugging Map Reduce Application Debugging Hadoop Map Reduce Locally, Performing Unit Testing for Map Reduce Applications.

UNIT- V

Exploring Hive: Introducing Hive, Hive Service, Built-In Functions in Hive, Hive DDI, Data Manipulation in Hive, Data Retrieval Queries, Using JOINS in Hive.

NoSQL Data Management Introduction to NoSQL, Types of NoSQL Data Models, Schema - Less Databases, Materialized Views, Distribution Models, Sharding.

Textbooks:

1. Big Data Black Book, DT Editorial services ,Dreamtech Press

Reference Books:

1. Data Science for Business by F. Provost and T. Fawcett, O'Reilly Media.

2. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced

3. Hadoop: The Definitive Guide by Tom White, O'Reilly Media.

4. Big Data and Business Analytics by Jay Liebowitz, Auerbach Publications, CRC Press.

**DATA SCIENCE & VISUALIZATION
III B.TECH., I SEMESTER**

Course Title: DATA SCIENCE & VISUALIZATION	Course Code:72PC07
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: Computer graphics, Database management system	

Course Objectives:

1. To learn data collection and preprocessing techniques for data science
2. To Understand and practice analytical methods for solving real life problems.
3. To study data exploration techniques
4. To learn different types of data and its visualization
5. To study different data visualization techniques and tools
6. To map element of visualization well to perceive information

Course Outcomes(s)

CO#	Course Outcomes
C312.1	Apply data preprocessing methods on open access data and generate quality data for Analysis
C312.2	Apply and analyze classification and regression data analytical methods for real life Problems.
C312.3	Implement analytical methods using Python/R
C312.4	Apply different data visualization techniques to understand the data.
C312.5	Analyze the data using suitable method; visualize using the open-source tool.
C312.6	Analyze the data using suitable method; visualize using the open-source tool.

COURSE CONTENT(SYLLABUS)

Unit- I

Introduction to Data Science: Defining data science and big data, Recognizing the different types of data, Gaining insight into the data science process, Data Science Process: Overview, Different steps, Machine Learning Definition and Relation with Data Science.

Unit -II

Statistics and Probability basics for Data Analysis: Statistics: Describing a Single Set of Data, Correlation, Simpson's Paradox, Some Other Correlational Caveats, Correlation and Causation Probability: Dependence and Independence, Conditional Probability, Bayes's Theorem, RandomVariables, Continuous Distributions, The Normal Distribution, The Central Limit Theorem

Unit- III

Data Analysis in depth: Data Analysis Theory and Methods: Clustering –Overview, K-means- overview of method, determining number of clusters, Association Rules- Overview of method, Apriori algorithm, evaluation of association rules, Regression-Overview of linear regression method, model description. Classification- Overview, Naïve Bayes classifier

Unit-IV

Advanced Data Analysis Means: Decision Trees: What Is a Decision Tree? Entropy, The Entropy of a Partition, Creating a Decision Tree, Random Forests Neural Networks: Perceptron's, Feed-Forward Neural Networks, Backpropagation, Example: Defeating a CAPTCHA MapReduce: Why MapReduce? Examples like word count and matrix multiplication Unit V Basics of Data Visualization. Introduction to data visualization, challenges of data visualization, Definition of Dashboard, Their type, Evolution of dashboard, dashboard design and principles, display media for dashboard. Types of Data visualization: Basic charts scatter plots, Histogram, advanced visualization Techniques. like streamline and statistical measures, Plots, Graphs, Networks, Hierarchies, Reports.

Unit-VI

Data visualization of multidimensional data: Need of data modeling, Multidimensional data models, Mapping of high dimensional data into suitable visualization method- Principal component analysis, clustering study of High dimensional data. Learning Resources

Text Books:

Data Mining: Concepts and Techniques, 3rd Edition. Jiawei Han, Micheline Kamber, Jian Pei.
Data Science from Scratch : Joel Grus, O'Reilly Media Inc., ISBN: 9781491901427
Information visualization perception for design, colin ware, MK publication

REFERENCE BOOKS:

Big data black book, Dream tech publication

Getting Started with Business Analytics: Insightful Decision-Making , David Roi Haroon, GalitShmueli, CRC Press

Business Analytics , James R Evans, Pearson

Python Data science Handbook, Jake VanderPlas, Orielly publication

Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking, Vovost Foster, Fawcett Tom

e-Books:

handbook for visualizing : a handbook for data driven design by Andy krik

<http://book.visualisingdata.com/>

<https://www.programmer-books.com/introducing-data-science-pdf/>

An Introduction to Statistical Learning with Applications in R

<http://faculty.marshall.usc.edu/gareth-james/ISL/>

MOOC/ Video Lectures available at:

□ <https://nptel.ac.in/courses/106/106/106106179/>

□ <https://nptel.ac.in/courses/106/106/106106212/>

□ <https://nptel.ac.in/courses/106/105/106105174/>

**MINING MASSIVE DATASETS
III B.TECH., I SEMESTER**

Course Title: MINING MASSIVE DATASETS	Course Code:AS20-72PC08
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: :A Course on “Database systems” & “Data structures”	

Course Objectives:

To provide comprehensive knowledge on developing and applying machine learning algorithms for massive real-world data sets in distributed frameworks.

- To demonstrate the use of big data analytics tools like Spark and Mahout for mining massive datasets.
- To impart in depth knowledge on Deep Learning and Extreme Learning concepts

Course Outcomes(s)

CO#	Course Outcomes
C313.1	Identify right machine learning/mining algorithm for handling massive data
C313.2	Apply classification and regression models with Spark and Mahout
C313.3	Implement clustering models using Spark and Mahout
C313.4	Apply semi supervised learning for clustering and classification
C313.5	Use deep learning to solve real-life problem
C313.6	Use Extreme Learning Machine for classification and regression

COURSE CONTENT

UNIT-I

Introduction to Data Mining, Theory of Map Reduce, Data Mining: What is Data Mining? Statistical Limits on Data Mining, Things Useful to Know Map Reduce and the New Software Stack: Distributed File Systems, Map Reduce, Algorithms Using Map Reduce, Extensions to Map Reduce, The Communication Cost Model, Complexity Theory for Map Reduce.

UNIT-II

Mining Data Streams: The Stream Data Model, Sampling Data in a Stream, Filtering Streams, Counting, Distinct Elements in a Stream, Estimating Moments, Counting Ones in a Window, Decaying Windows Link Analysis: Page Rank, Efficient Computation of Page Rank, Topic-Sensitive Page Rank, Link Spam, Hubs and Authorities

UNIT- III

Clustering, Advertising on the Web, Clustering: Introduction to Clustering Techniques, Hierarchical Clustering, K-means Algorithms, The CURE Algorithm, Clustering in Non-Euclidean Spaces, Clustering for Streams and Parallelism Advertising on the Web: Issues in On-Line Advertising, On-Line Algorithms, The Matching Problem, The Ad Words Problem.

UNIT-IV

Mining Social-Network Graphs, Mining Social-Network Graphs: Clustering of Social-Network Graphs-Direct Discovery of Communities-Partitioning of Graphs, Finding Overlapping Communities-Counting Triangles using Map Reduce, Neighborhood Properties of Graphs

Dimensionality Reduction: Eigenvalues and Eigenvectors of Symmetric Matrices, Principal-Component Analysis, Singular-Value Decomposition, CUR Decomposition

UNIT- V

Large-Scale Machine Learning, Large-Scale Machine Learning: The Machine-Learning Model, Perceptron's, Support-Vector Machines, Learning from Nearest Neighbors, Comparison of Learning Methods.

TEXTBOOKS:

1. Jure Leskovec, Anand Rajaraman, Jeffrey Ullman, "Mining of Massive Datasets", Stanford Press, 2011.
2. Nick Pentreath, "Machine Learning with Spark", Packt Publishing.
3. Olivier Chapelle, Bernhard Scholkopf, Alexander Zien "Semi-Supervised Learning", The MIT Press, 2006

REFERENCE BOOKS:

1. Ron Bekkerman, Mikhail Bilenko, John Langford "Scaling Up Machine Learning: Parallel and Distributed Approaches", Cambridge University Press, 2012.
2. Jimmy Lin, Chris Dyer, "Data Intensive Text Processing with MapReduce", Morgan Claypool Publishers, 2010.
3. Hennessy, J.L. and Patterson, D.A., 2011. Computer architecture: a quantitative approach. Elsevier.
4. Chandramani Tiwary "Learning Apache Mahout", Packt Publishing, 2015.
5. Fuchen Sun, Kar Ann Toh, Manuel Grana Romay, Kezhi Mao, "Extreme Learning Machines 2013: Algorithms and Applications", Springer, 2014.
6. Mode of Evaluation: CAT/Assignment /Quiz / FAT/Project /Seminar

ONLINE LEARNING RESOURCES:

1. Data Mining - Course (nptel.ac.in)
2. Mining Massive Datasets | edX

**DATA ANALYTICS
PROFESSIONAL ELECTIVE - I
III B.Tech., I-Sem.,**

Course Title: DATA ANALYTICS	Course Code:AS20-72PE11
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: You will be able to find information about Data analytics	

COURSE OVERVIEW:

Data analysis is a process for obtaining raw data and subsequently converting it into information useful for decision making by users. Data collected and analyzed to answer to questions, test hypotheses , or disprove theories.

Course Objectives: To explore the fundamental concepts of data analytics.

- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understand the impact of data analytics for business decisions and strategy to Carry out data analysis/statistical analysis
C314.2	To carry out standard data visualization and formal inference procedures, Design Data Architecture
C314.3	Understand various Data Sources
C314.4	Understand varies techniques of Data Analytics
C314.5	Understand data distribution
C314.6	Understand hidden data Patterns

COURSE CONTENT

UNIT - I

Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing.

UNIT - II

Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT - III

Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc. Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT - IV

Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building –

Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction.

UNIT - V

Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Student's Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addison Wesley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Millway Labs Jeffrey D Ullman Stanford Univ.

**BUSINESS INTELLIGENCE
PROFESSIONAL ELECTIVE - I
III B.TECH., I SEMESTER**

Course Title: BUSINESS INTELLIGENCE	Course Code: AS20-72PE12
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
<p>Prerequisites: This course is intended to provide an integrative foundation in the field of business intelligence at the operational, tactical, and strategic levels. Topics such as value chain, customer service management, business process analysis and design, transaction processing systems, management information systems, and executive information systems will be covered, along with other topics relevant to the field of business intelligence. A critical success factor in Business Intelligence is the ability to communicate one's analyses and recommendations to decision-makers. In this capstone course, students are directed to prepare a thesis document that serves as a model for doing this effectively. Issues examined include writing an effective thesis statement, making logical arguments, the constraints imposed by media richness, and the limitations of transferring explicit knowledge.</p>	

Course Objectives

The objective of this course is to

1. learn Business Intelligence.

Course Outcomes(s) On completion of this course, the students will be able to

CO#	Course Outcomes
C314.1	Gain knowledge of Business Intelligence
C314.2	Build business projects
C314.3	Generate and manage BI reports
C314.4	Do BI Deployment, Administration & Security.
C314.5	
C314.6	

COURSE CONTENT

Unit I: Introduction to Business Intelligence

Understanding the scope of today's BI solutions and how they fit into existing infrastructure
Assessing new options such as SaaS and cloud-based technology. Describe BI, its components & architecture, previewing the future of BI
Crafting a better experience for all business users, End User Assumptions, Setting up Data for BI, The Functional Area of BI Tools, Query Tools and Reporting, OLAP and Advanced Analytics, Supporting the requirements of senior executives, including performance management.

Unit II: Elements of Business Intelligence Solutions

Reports & ad hoc queries; Analyse OLAP data; Dashboards & Scorecards development, Metadata Models; Automated tasks & events; Mobile & disconnected BI; Collaboration capabilities; Real time monitoring capabilities; Software development kit; Consume BI through portals, web applications, Desktop applications.

Unit III: Building the BI Project

Planning the BI project, Project Resources; Project Tasks, Risk Management and Mitigation, Cost-justifying BI solutions and measuring success, Collecting User Requirements,

Requirements-Gathering Techniques; Prioritizing & Validating BI Requirements, Changing Requirements; BI Design and Development, Best Practices for BI Design; Post-Implementation Evaluations, Maintaining Your BI Environment.

Unit IV: Reporting authoring

Building reports with relational vs Multidimensional data models ; Types of Reports – List, crosstabs, Statistics, Chart, map, financial etc; Data Grouping & Sorting, Filtering Reports, Adding Calculations to Reports, Conditional formatting, Adding Summary Lines to Reports. Drill up, drill- down, drill-through capabilities. Run or schedule report, different output forms – PDF, excel, csv, xml etc.

Unit V: BI Deployment, Administration & Security

Centralized Versus Decentralized Architecture, BI Architecture Alternatives, phased & incremental BI roadmap, System Sizing, Measurements and Dependencies, System Sizing, Measurements, and Dependencies. Setting Early Expectations and Measuring the Results. End- User Provisos. OLAP Implementations. Expanding BI Authentication Authorization, Access Permissions, Groups and Roles, Single-sign on Server Administration, Manage Status & Monitoring, Audit, Mail server & Portal integration, Back Up and Restore.

TEXT BOOKS

1. Business Intelligence (IBM ICE Publication).

REFERENCE BOOKS

1. http://en.wikipedia.org/wiki/Business_intelligence.
2. http://www.webopedia.com/TERM/B/Business_Intelligence.html.
3. [Http://www.cio.com/article/40296/Business_Intelligence_Definition_and_Solutions](http://www.cio.com/article/40296/Business_Intelligence_Definition_and_Solutions).

**COMPUTER NETWORKS
PROFESSIONAL ELECTIVE - I
III B.TECH., I SEMESTER**

Course Title: COMPUTER NETWORKS	Course Code: AS20-72PE13
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: You will be able to find information about Data analytics	

Course Objectives:

The course is designed to

- Understand the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Expose the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Familiarize with the applications of Internet
- Elucidate the design issues for a computer network

Course Outcomes(s) On completion of this course, the students will be able to

CO#	Course Outcomes
C314.1	Identify the software and hardware components of a computer network
C314.2	Design software for a computer network
C314.3	Develop new routing, and congestion control algorithms
C314.4	Assess critically the existing routing protocols
C314.5	Explain the functionality of each layer of a computer network
C314.6	Choose the appropriate transport protocol based on the application requirements

COURSE CONTENT

UNIT I Computer Networks and the Internet

What Is the Internet? The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet - Switched Networks, Reference Models, Example Networks, Guided Transmission Media,
Wireless Transmission

UNIT II The Data Link Layer, Access Networks, and LANs

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols (Textbook 1) Introduction to the Link Layer, Error-Detection and - Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks

Link Virtualization: A Network as a Link Layer, Data Center Networking, Retrospective: A Day in the Life of a Web Page Request (Textbook 2)

UNIT III The Network Layer

Routing Algorithms, Internetworking, The Network Layer in The Internet (Textbook 1)

UNIT IV The Transport Layer

Connectionless Transport: UDP (Textbook 2), The Internet Transport Protocols: TCP, Congestion Control (Textbook 1)

UNIT V Principles of Network Applications Lecture 8Hrs Principles of Network Applications, The Web and HTTP, Electronic Mail in the Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications Video Streaming and Content Distribution Networks (Textbook 2)

Textbooks:

1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

Reference Books:

1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016.

Online Learning Resources: <https://nptel.ac.in/courses/106105183/25>
<http://www.nptelvideos.in/2012/11/computer-networks.html>
<https://nptel.ac.in/courses/106105183/3>

MATLAB PROGRAMMING FOR ENGINEERS (Open Elective I) III B.TECH., I SEMESTER

Course Title: MATLAB PROGRAMMING FOR ENGINEERS	Course Code:AS20-72OE11
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “INTRODUCTION TO MATLAB AND ITS APPLICATIONS”	

Course Objectives: On completion of the course, students will be able to

- Generate arrays and matrices for numerical problems solving.
- Represent data and solution in graphical display.
- Write scripts and functions to easily execute series of tasks in problem solving.
- Use arrays, matrices and functions in Engineering applications
- Design GUI for basic mathematical applications.

CO#	Course Outcomes
C315.1	Understand the need for simulation/implementation for the verification of mathematical functions
C315.2	Understand the main features of the MATLAB/SCILAB program development environment to enable their usage in the higher learning.
C315.3	Implement simple mathematical functions/equation in numerical computing environment such as MATLAB/SCILAB
C315.4	Interpret and visualize simple mathematical functions and operations there on using plots/display
C315.5	Analyze program for correct ness and determined/ estimate/predict the output and verify it under simulation environment using MATLAB/SCILAB Tools.
C315.6	Implement simple Data types-classification, memory requirement, range of values, usage and types specifiers.

COURSE CONTENT

UNIT- I

Introduction: Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types. MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays -manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file. Programming Basics: Data Types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if- elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT- II

Scripts and Functions Script Files, Function Files, Debugging methods in MATLAB. Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options Multiple plots-subplots-specialized 2D plots: stem-, bar, hist, pi, stairs, loglog, semi log, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, EZ-plot.

UNIT-III

Numerical Methods Using MATLAB Numerical Differentiation, Numerical integration-Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration. Linear Equations- Linear algebra in MATLAB, solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT-IV

Nonlinear Equations System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions polyval and polyfit, cubic fit using least square method. Finding roots of a polynomial - roots function, Newton-Raphson Method.

UNIT V

Solution of Ordinary differential Equations (ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First -order equations using ODE23 and ODE45. Structures and Graphical user interface (GUI): Advanced data Objects, how a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siau Alexandre Bayen, Elsevier-18th April 2014.
5. <https://nptel.ac.in/courses/103106118/2>
6. <https://www.udemy.com/numerical-method>

**MULTIMEDIA COMPUTING
III B.TECH., II SEMESTER
OPEN ELECTIVE - I**

Course Title: MULTIMEDIA COMPUTING	Course Code: AS20-72OE12
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Algorithm, basic multimedia skills	

Course Overview:

After learning the course the students should be able to: Understand basics of multimedia computing, Different Audio-Video Compression Techniques and Application of Multimedia Networks.

Course Objective

- Identify the essential features of graphics/image data types, file formats, and colour models in images and video.
- Explain the technical details of multimedia data representations.
- Perform a comparative analysis of the major methods and algorithms for multimedia data compression.
- Explain the technical details of popular multimedia compression standards.

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Understanding different forms of media and their digital representations.
C315.2	Gain knowledge of computer methods and tools for processing, recognizing, and creating different media.
C315.3	Gain knowledge of multimedia encoding and compression
C315.4	Understand different compression principles, techniques, and standards to design and develop multimedia systems according to the requirements of multimedia applications.
C315.5	Understand different data formats be able to take into considerations in multimedia system designs.
C315.6	Understand the Multimedia Networks basic and its applications

COURSE CONTENT

UNIT - I

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, Color in image and video: color science, color models in images, color models in video.

UNIT - II

Fundamental concepts in video and digital audio:Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia data compression I:Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression,

UNIT - III

Multimedia data compression II: Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT - IV

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT - V

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. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew Pearson Education.

REFERENCES BOOKS:

- 1 Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
- 2 Multimedia Technology and Applications, David Hilman, Galgotia
- 3 Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
- 4 Multimedia Applications, Steinmetz, Nahrstedt, Springer.
- 5 Macromedia Flash MX Professional 2004 Unleashed, Pearson.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://www.coursera.org/lecture/internet-of-things-multimedia/multimedia-computing-and-classification-KRa30>

WEB REFERENCE/E-BOOKS:

1. <https://www.tutorialspoint.com/multimedia/index.htm>
2. <http://eilat.sci.brooklyn.cuny.edu/cis52/index.php?q=pages&id=5>

OPTIMIZATION TECHNIQUES (Open Elective I) III B.TECH., I SEMESTER

Course Title: OPTIMIZATION TECHNIQUES	Course Code: AS20-72OE13
Teaching Scheme (L:T:P):	Credits:
Type of Course:	Total Contact Periods:
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course On “Linear Algebra And Advanced Calculus” & “Differential Equations And Vector Calculus” & “Mathematical Foundations For Computer Science”	

COURSE OVERVIEW:

Optimization techniques using both linear and non-linear programming. The focus of the course is on convex optimization though some techniques will be covered for non-convex function optimization too. After an adequate introduction to linear algebra and probability theory, students will learn to frame engineering minima maxima problems in the framework of optimization problems.

COURSE OBJECTIVES:

This course enables the students to classify and formulate real-life problem for modeling as optimization problem, solving and applying for decision making.

COURSE OUTCOMES:

CO#	Course Outcomes
C315.1	Recall the theoretical foundations of various issues related to linear programming modeling to formulate real-world problems as a L P model.
C315.2	Explain the theoretical workings of the graphical, simplex and analytical methods for making effective decision on variables so as to optimize the objective function.
C315.3	Identify appropriate optimization method to solve complex problems involved in various industries.
C315.4	Demonstrate the optimized material distribution schedule using transportation model to minimize total distribution cost.
C315.5	Find the appropriate algorithm for allocation of resources to optimize the process of assignment
C315.6	Explain the theoretical workings of sequencing techniques for effective scheduling of jobs on machines.

COURSE CONTENT

UNIT I

Introduction to operational research-Linear programming problems (LPP)-Graphical method-Simplex method-Big M Method-Dual simplex method.

UNIT II

Transportation problems- assignment problems-Game theory.

UNIT III

CPM and PERT –Network diagram-Events and activities-Project Planning-Reducing critical events and activities-Critical path calculations.

UNIT IV

Sequencing Problems- Replacement problems- Capital equipment- Discounting costs- Group replacement.

UNIT V

Inventory models- various costs- Deterministic inventory models- Economic lot size- Stochastic inventory models- Single period inventory models with shortage cost.

Textbooks:

1. Operations Research , S.D. Sharma.
2. Operations Research, An Introduction, Hamdy A. Taha, Pearson publishers.
3. Operations Research, Nita H Shah, Ravi M Gor, Hardik Soni, PHI publishers

Reference Books:

1. Problems on Operations Research, Er. Prem kumargupta, Dr.D.S. Hira, Chand publishers
2. Operations Research, CB Gupta, PK Dwivedi, Sunil kumaryadav

Online

Learning

Resources:

https://nptel.ac.in/content/storage2/courses/105108127/pdf/Module_1/M1L2slides.pdf

<https://slideplayer.com/slide/7790901/>

<https://www.ime.unicamp.br/~andreani/MS515/capitulo12.pdf>

**MINING MASSIVE DATASETS LAB
III B.TECH., I SEMESTER**

Course Title: MINING MASSIVE DATASETS LAB	Course Code: AS20-72PC09
Teaching Scheme (L:T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: A Course on “Database systems” & “Data structures”	

COURSE OVERVIEW:

Mining massive Datasets is graduate level course that discussed data mining and machine learning algorithms for analyzing very large amounts of data. The emphasis is on Map Reduce as a tool for creating parallel algorithms that can process very large amounts of data.

COURSE OBJECTIVES:

The students will be able to learn:

- Understand the complexity of extracting the information from massive data sets
- Demonstrate processing of massive data sets

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

CO#	Course Outcomes
C315.1	Recall the theoretical foundations of various issues related to linear programming modeling to formulate real-world problems as a L P model.
C315.2	Explain the theoretical workings of the graphical, simplex and analytical methods for making effective decision o variables so as to optimize the objective function.
C315.3	Identify appropriate optimization method to solve complex problems involved in various industries.
C315.4	Demonstrate the optimized material distribution schedule using transportation model to minimize total distribution cost.
C315.5	Find the appropriate algorithm for allocation of resources to optimize the process of assignment
C315.6	Explain the theoretical workings of sequencing techniques for effective scheduling of jobs on machines.

List Of Experiments

1. Write code for Map reduce word count program?
2. Write a program to implement page rank algorithm?
3. Implement k-nearest neighbours algorithm using any example dataset
 - Find classification of data?
 - Find Euclidean distance?
 - Calculate neighbour class and find max?
4. Social-network graphs

5. Apply the principal component analysis (PCA) function in to the training and testing data for predicting results by using appropriate dataset?
6. Implementation Support vector machine using appropriate dataset as example?

PROJECTS:

1. Build a Recommendation System by using Movie recommender database in Machine learning?
2. Implement a Decision tree algorithm on the Balance Scale Weight & Distance Database?
3. Implement k means clustering using Mall Customers dataset?
4. Given below is the data regarding the electrical consumption of an organization. It contains the monthly electrical consumption and the annual average for various years, If the above data is given as input, we have to write applications to process it and produce results such as finding the year of maximum usage, year of minimum usage, and so on.

To solve these problems, use Map Reduce framework?

References:

1. Mining of Massive Datasets, Anand Rajaraman Jeffrey David Ullman.

Online Learning Resources/Virtual Labs:

1. Mining Massive Datasets | edX

2. GitHub - tmp-coder/cs246-Mining-Massive-Data-Sets: coursework for stanford cs246
<http://web.stanford.edu/class/cs246>

DATA SCIENCE & VISUALIZATION LAB
LIST OF ASSIGNMENTS

Course Title: DATA SCIENCE & VISUALIZATION	Course Code:AS20-72PC10
Teaching Scheme (L:T:P): 0:0:3	Credits: 3
Type of Course: Practical	Total Contact Periods: 48 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites: Computer graphics, Database management system	

Course Overview

Define Data Analytics and the key steps in the Data Analytics process. Describe the key components of a modern data ecosystem. Discover the various career opportunities available to Data Analysts. Describe the steps you need to take to extract raw data from disparate sources, transform raw data into analytics-ready data, and load data into data repositories for use in analytics and reporting. Describe the process, tools, and techniques required for data wrangling, data cleaning, data mining, and data visualization. Perform data wrangling, data cleansing, and data analysis tasks using spread sheets like Microsoft Excel. Analyze data using filter, sort, and pivot features within spread sheets like Microsoft Excel. Design data visualizations using charts, graphs, and plots with tools like Microsoft Excel. Design and create dashboards in a cloud platform using Cognos Analytics.

Course Objectives:

- To learn data collection and preprocessing techniques for data science
- To Understand and practice analytical methods for solving real life problems.
- To study data exploration techniques
- To learn different types of data and its visualization
- To study different data visualization techniques and tools
- To map element of visualization well to perceive information

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Apply data preprocessing methods on open access data and generate quality data for Analysis
C315.2	Apply and analyze classification and regression data analytical methods for real life Problems.
C315.3	Implement analytical methods using Python/R
C315.4	Apply different data visualization techniques to understand the data.
C315.5	Analyze the data using suitable method; visualize using the open-source tool.
C315.6	Analyze the data using suitable method; visualize using the open-source tool.

LIST OF ASSIGNMENTS

Sr. No	NAME OF THE ASSIGNMENT
1	<p>Access an open source dataset “Titanic”. Apply pre-processing techniques on the raw dataset</p>
2	<p>Build training and testing dataset of assignment 1 to predict the probability of a survival of a person based on gender, age and passenger-class.</p>
3	<p>Download Abalone dataset. (URL: http://archive.ics.uci.edu/ml/datasets/Abalone) Data set has total 8 Number of Attributes. Sex nominal M, F, and I (infant) Length continuous mm Longest shell measurement Diameter continuous mm perpendicular to length Height continuous mm with meat in shell Whole weight continuous grams whole abalone Shucked weight continuous grams weight of meat Viscera weight continuous grams gut weight (after bleeding) Shell weight continuous grams after being dried Rings (age/class of abalone) Load the data from data file and split it into training and test datasets. Summarize the properties in the training dataset. The number of rings is the value to predict: either as a continuous value or as a classification problem. Predict the age of abalone from physical measurements using linear regression or predict ring class as classification problem</p>
4	<p>Use Netflix Movies and TV Shows dataset from Kaggle and perform following operation :</p> <ol style="list-style-type: none"> 1. Make a visualization showing the total number of movies watched by children 2. Make a visualization showing the total number of standup comedies 3. Make a visualization showing most watched shows. 4. Make a visualization showing highest rated show <p>Make a dashboard (DASHBOARD A) containing all of these above visualizations.</p>

**ADVANCED ENGLISH COMMUNICATION SKILLS LAB
III B.TECH., I SEMESTER**

Course Title: ADVANCED ENGLISH COMMUNICATION SKILLS LAB	Course Code:AS20-00HS05
Teaching Scheme (L:T:P) : 0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: <ol style="list-style-type: none"> 1. The students should have a basic knowledge of English language 2. Must obtain Grammar, and basic Speaking skills 3. Should able to communicate in English language 4. Able to use different types of vocabulary in different of situations 	

Course Overview:

A course on Advanced English Communication Skills (AECS) Lab is considered essential at the third-year level of B. Tech courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements. The time should be utilized for activity-based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objective

- To improve students' fluency in spoken English
- To enable them to listen to English spoken at normal conversational speed
- To read and comprehend texts in different contexts
- To communicate their ideas relevantly and coherently in writing
- To make students industry-ready
- To help students acquire behavioral skills for their personal and professional life
- To respond appropriately in different socio-cultural and professional contexts

Course Outcomes(s)

CO	Course Outcomes
C318.1	Acquire vocabulary and use it contextually.
C318.2	Listen and speak effectively.
C318.3	Develop proficiency in academic reading and writing.
C318.4	Increase possibilities of job prospects.
C318.5	Communicate confidently in formal and informal contexts.
C318.6	Acquire information from non-verbal to verbal texts and vice-versa.

COURSE CONTENT

UNIT - I

Interpersonal Communication: Self Introduction - Starting a Conversation – Indianisms- Responding Appropriately and Relevantly – Using Appropriate Body Language. Role Play in Different Situations. Reading Comprehension – General Vs. Local Comprehension- Techniques of Reading- Critical Reading- Reading Beyond the Lines and Between the lines- Comprehension on Data Interpretation.

UNIT - II

Writing Skills: Structure and Presentation of Different Types of Writing – Letter SOP- Letter of Recommendation- Resume Writing- e-correspondence- Abstract writing- Technical Report Writing.

UNIT - III

Presentation Skills: Oral Presentations through JAM Sessions- Seminars- PPTs and Written Presentations through Posters.

UNIT - IV

Group Discussion and Interview Skills: Dynamics of Group Discussion, Pre-interview Planning - Opening Strategies- Answering Strategies –Mock Interviews.

UNIT - V

Corporate Expectations: Grooming and etiquette - Mini Project General and Technical- Human Values and Professional Ethics- Team Building

TEXT BOOKS:

1. Kumar, Sanjay and PushpLata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011

REFERENCE BOOKS

1. Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011
3. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
4. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
5. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
6. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Job Hunting by Colm Downes, Cambridge University Press 2008.
11. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_hs14/preview
2. https://onlinecourses.nptel.ac.in/noc20_hs19/preview
3. <https://www.classcentral.com/course/swayam-better-spoken-english-12978>
4. <https://www.naukri.com/learning/technical-english-for-engineers-course-nptel62>
5. <https://www.britishcouncil.org/tr/en/english/mooc/english-for-the-workplace>

WEB REFERENCE/E-BOOKS:

1. <https://mrnussbaum.com/lang-arts/reading-comprehension-online>
2. https://www.researchgate.net/publication/325093121_THE_USE_OF_EBOOK_TO_IMPROVE_READING_COMPREHENSION_AMONG_YEAR_4_PUPILS
3. <https://englishlive.ef.com/en-gb/resources/english-language-ebook/english-vocabulary-tips/>
4. <https://www.sagepub.com/hi/nam/interpersonal-communication/book262976#contents>
5. <http://home.lu.lv/~s10178/interpersonalcommunication.pdf>
6. http://toefl.uobabylon.edu.iq/papers/itp_2015_12653122.pdf
7. <https://vulms.vu.edu.pk/Courses/ENG001/Downloads/The%20Complete%20Presentation%20Skills%20Handbook.pdf>
8. https://www.sastra.edu/nptel/download/Prof%20GPRagini/pdf_New/Unit%2026.pdf
9. <https://www.fip.org/files/yypg/Project%20Documents/career%20development/CareerDevelopment-Interviews.pdf>
10. <https://ccsuniversity.ac.in/bridge-library/magzine/Interview-Skills.pdf>

CYBER SECURITY
III B.TECH., I SEMESTER
MANDATORY COURSE

Course Title: Cyber Security	Course Code: AS20-00MC06
Teaching Scheme (L: T:P): 3:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 48Hrs
Continuous Internal Evaluation: 0 Marks	Semester End Exam: 100 Marks
Prerequisites: Awareness on fundamental rights and duties	

COURSE OVERVIEW

This course aims at providing the attendee with a broad introduction to the profound concepts in Cyber Security and Ethical Hacking using forensic detection by exposing them to practical scenarios in order to make them industry ready. It's definitely beneficial to professionals looking for change/ advancement in their career as well as Budding Engineers to start their career as Ethical Hacking Data Scientist, Cyber Security Engineer, Anti Cyber Terrorism Scientist, etc.

COURSE OBJECTIVE

- To learn foundations of Cyber Security and Ethical Hacking analysis using programming languages like python.
- To learn various types of algorithms and its applications of Cyber Security and Ethical Hacking using forensic detection
- To learn python toolkit for required for programming Cyber Security, Ethical Hacking concepts.
- To understand the concepts of Cyber Security, Ethical Hacking Forensic detection image processing, pattern recognition, and natural language processing.
- To identify insights on how to apply Cyber Security, Ethical Hacking to solve interdisciplinary problems.

COURSE OUTCOMES

CO#	Course Outcomes
C319.1	Gains the fundamental knowledge over cyber-Security.
C319.2	Discuss on Indian cyber space and cyber forensics.
C319.3	Analyzes on cyber-crime over mobile and wireless devices.
C319.4	Analyze the various phenomena of various cyber-crime and cyber terrorism.
C319.5	Implications of organization towards cyber security
C319.6	Discuss on privacy issues along with examples of cybercrimes.

COURSE CONTENT (SYLLABUS)

UNIT I

ESSENTIAL TERMINOLOGIES

CIA, Risks, Breaches, Threats, Attacks, Exploits. Information Gathering (Social Engineering, Foot Printing & Scanning). Open Source/ Free/ Trial Tools: nmap, zenmap, Port Scanners, Network scanners

UNIT II

INTRODUCTION TO CRYPTOGRAPHY

Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security, Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT III

INTERNET SECURITY

Cloud Computing & Security, Social Network sites security, Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Authorization, Unprotected Broadband communications, Poor Cyber Security Awareness.

UNIT IV

EXPLANATION OF MALWARE, TYPES OF MALWARE

Virus, Worms, Trojans, Root-kits, Robots, Adware's, Spywares, Ransom wares, Zombies etc., OS Hardening (Process Management, Memory Management, Task Management, Windows Registry/ services another configuration), Malware Analysis. Open Source/ Free/ Trial Tools: Antivirus Protection, Anti Spywares, System tuning tools, Anti Phishing.

UNIT V

CYBER SECURITY REGULATIONS

Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013. Introduction to Cyber Forensics, Need of Cyber Forensics, Cyber Evidence, Documentation and Management of Crime Scene, Image Capturing and its importance, Partial Volume Image, Web Attack Investigations, Denial of Service Investigations, Internet Crime Investigations, Internet Forensics, Steps for Investigating Internet Crime, Email Crime Investigations.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security”, Pearson Education/PHI, 2006.
2. V.K. Jain, “Cryptography and Network Security”, Khanna Publishing House.
3. Gupta Sarika, “Information and Cyber Security”, Khanna Publishing House, Delhi.

REFERENCE BOOKS

1. Atul Kahate, “Cryptography and Network Security”, McGraw Hill.
2. V.K. Pachghare, “Cryptography and Information Security”, PHI Learning
3. Nina Godbole, “Information System Security”, Wiley
4. Bothra Harsh, “Hacking”, Khanna Publishing House, Delhi

ONLINE RESOURCES

1. <https://www.coursera.org/specializations/intro-cyber-security>
2. <https://www.coursera.org/specializations/it-fundamentals-cybersecurity>
3. <https://www.coursera.org/specializations/cyber-security>

E-BOOKS

1. <http://library.lol/main/F7310EE2F36499B70E730BAA66024D57>
2. <http://library.lol/main/BF50C74916D308C5DF574BEA0A39A492>

**CONSTITUTION OF INDIA
III B.TECH., II SEMESTER
MANDATORY COURSE**

Course Title: Constitution of India	Course Code: AS20-00MC03
Teaching Scheme (L:T:P): 3:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 48Hrs
Continuous Internal Evaluation: 0 Marks	Semester End Exam: 100 Marks
Prerequisites: Awareness on fundamental rights and duties	

COURSE OVERVIEW

Identify and explore the basic features and modalities about Indian constitution. Differentiate and relate the functioning of Indian parliamentary system at the center and state level. Differentiate different aspects of Indian Legal System and its related bodies.

COURSE OBJECTIVES

- To enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties.
- To know about the Administration, Concept and Development of Human Rights,
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court, controller and auditor general of India and election commission of India.
- To understand the central and state relation, financial and administrative.

COURSE OUTCOMES

CO#	Course Outcomes
C3110.1	To understand the sources, features and principles of Indian Constitution.
C3110.2	To analyze about Union Government, State government and its administration.
C3110.3	To remember to get acquainted with Local administration and PachayatiRaj.
C3110.4	To understand Be aware of basic concepts and developments of Human Rights.
C3110.5	To apply Gain knowledge on roles and functioning of Election Commission.
C3110.6	To understand the election commission for sustaining democracy, application.

COURSE CONTENT (SYLLABUS)

UNIT-I

CONSTITUTION

Introduction to constitution of India, Meaning and importance of Constitution, Making of Indian Constitution, Sources, Salient features of Indian Constitution, and constitutional history, Features, itizenship, Preamble, Fundamental Rights and Directive Principles: Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.

UNIT II

GOVERNMENT OF INDIAN UNION

President of India – Election and Powers , Prime Minister and Council of Ministers Lok Sabha , Cabinet and Central Secretariat – Composition and Powers, Rajya Sabha – Composition and Powers, Federalism, Centre- State relationship, Lok Sabha, Rajya Sabha, Government of Indian State: State Government and its Administration Governor - Powers, Chief Minister and Council of Ministers, Legislative Assembly – Composition and powers, Legislative Council – Composition and powers State Secretariat: Organization, Structure and Functions,

UNIT III

THE JUDICIARY

Features of judicial system in India, Supreme Court –Structure, functions and jurisdiction, High Court – Structure , function and jurisdiction, Local Administration District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, B: Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT IV

CONCEPT AND DEVELOPMENT OF HUMAN RIGHTS

Meaning Scope and Development of Human Rights, United Nations and Human Rights – UNHCR, UDHR 1948, ICCPR 1996 and ICESCR 1966, Human Rights in India: Protection of Human Rights Act, 1993 (NHRC and SHRC), First, Second and Third Generation Human Rights, Judicial Activism and Human Rights. Citizen oriented measures – RTI and PIL – Provisions and significance

UNIT V

FEDERALISM IN INDIA

Features, Election Commission: Election Commission- Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women 117

TEXT BOOKS

1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018 (23rd edn.)
2. M.V.Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)
3. J.A. Siwach, Dynamics of Indian Government & Politics.

REFERENCE BOOKS

1. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
2. J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edn.)

ONLINE RESOURCES

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

E-BOOKS

1. <http://library.lol/main/2A7FB89E7B5CFF9DEFEB9F43CC29900F>
2. <http://library.lol/main/0ADE390FC5736E2B273EDE65647D91D5>
<http://library.lol/main/BC24432ACB86AB3A590979D22D12D9B3>

**B.Tech.,
THIRD YEAR
SEOND SEMESTER
SYLLABUS**

**NATURAL LANGUAGE PROCESSING
III B.TECH., II SEMESTER**

Course Title: NATURAL LANGUAGE PROCESSING	Course Code:AS20-72PC12
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites :A Course on “Principles of Artificial Intelligence “& “ROBOTICS AND ITS APPLICATIONS”	

COURSE OVERVIEW

The Natural Language Processing course covers concepts like statistical machine translation and neural models, deep semantic similarity models (DSSM), neural knowledge base embedding, deep reinforcement learning techniques, neural models applied in image captioning, and visual question answering with Python's Natural ...

COURSE OBJECTIVE

Explain and apply fundamental algorithms and techniques in the area of natural language processing (NLP) Discuss approaches to syntax and semantics in NLP.
Examine current methods for statistical approaches to machine translation.
Teach machine learning techniques used in NLP.

Course Outcomes

CO#	Course Outcomes
C321.1	Understand the various NLP Applications and Organization of Natural language,.
C321.2	Apply the various Parsing techniques
C321.3	Apply Semantic Interpretation and Language Modeling.
C321.4	Apply the concept of Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.
C321.5	To learn and implement realistic applications using Python.
C321.6	To learn Bayes Rule, Shannon game, Entropy and Cross Entropy.

COURSE CONTENT

UNIT-I

Introduction to Natural language: The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

UNIT 2

Grammars and Parsing:-Top-Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayees Rule, Shannon game, Entropy and Cross Entropy.

UNIT-III

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

UNIT-IV

Semantic Interpretation: Semantic & Logical form, Word senses & ambiguity, The basic logical form language, Encoding ambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts & embedded sentences, Defining semantics structure model theory. Language Modelling Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modelling Problems, Multilingual and Cross lingual Language Modelling.

UNIT-V

Machine Translation: Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval Introduction, Document Pre-processing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources. Multilingual Automatic Summarization Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets.

Textbooks:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M.Bikel and ImedZitouni, Pearson Publications.
3. Natural Language Processing, A paninian perspective, AksharBharathi, Vineetchaitanya, Prentice–Hall of India.

Reference Books:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993

**MACHINE LEARNING
III B.TECH., II SEMESTER**

Course Title: MACHINE LEARNING	Course Code:AS20-72PC13
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A course on “ principles of artificial intelligence “	

Course Overview

Machine learning is a subfield of artificial intelligence, which is broadly defined as **the capability of a machine to imitate intelligent human behavior**. Artificial intelligence systems are used to perform complex tasks in a way that is similar to how humans solve problems.

Course Objectives

The course is introduced for students to

- Understand basic concepts of Machine Learning
- Study different learning algorithms
- Illustrate evaluation of learning algorithms

Course Outcomes (CO)

CO#	Course Outcomes
C322.1	Identify machine learning techniques suitable for a given problem
C322.2	Solve the problems using various machine learning techniques
C322.3	Design application using machine learning techniques
C322.4	To learn Bayes Rule, Shannon game, Entropy and Cross Entropy
C322.5	To learn data distribution techniques
C322.6	To learn different data prediction techniques

COURSE CONTENT

UNIT – I

Introduction to Machine Learning & Preparing to Model Lecture 9Hrs Introduction: What is Human Learning? Types of Human Learning, what is Machine Learning? Types of Machine Learning, Problems Not to Be Solved Using Machine Learning, Applications of Machine Learning, State-of-The-Art Languages/Tools in Machine Learning, Issues in Machine Learning Preparing to Model: Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre-Processing

UNIT – II

Modeling and Evaluation & Basics of Feature Engineering Lecture 9Hrs Introduction, selecting a Model, training a Model (for Supervised Learning), Model Representation and Interpretability, Evaluating Performance of a Model, Improving Performance of a Model Basics of Feature Engineering: Introduction, Feature Transformation, Feature Subset Selection

UNIT – III

Bayesian Concept Learning & Supervised Learning: Classification Lecture 10Hrs Introduction, Why Bayesian Methods are Important? Bayes’ Theorem, Bayes’ Theorem and Concept Learning, Bayesian Belief Network

Supervised Learning: Classification: Introduction, Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms-k-Nearest Neighbour (kNN), Decision tree, Random forest model, Support vector machines

UNIT – IV

Supervised Learning: Regression Lecture 10Hrs Introduction, Example of Regression, Common Regression Algorithms-Simple linear regression, Multiple linear regression, Assumptions in Regression Analysis, Main Problems in Regression Analysis, Improving Accuracy of the Linear Regression Model, Polynomial Regression Model, Logistic Regression, Maximum Likelihood Estimation.

UNIT – V

Introduction, Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering – Clustering as a machine learning task, Different types of clustering techniques, Partitioning methods, K-Medoids: a representative object-based technique, Hierarchical clustering, Density-based methods- DBSCAN Finding Pattern using Association Rule- Definition of common terms, Association rule, Theapriori algorithm for association rule learning, Build the apriori principle rules

Textbooks:

1. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson, 2019.

Reference Books:

1. EthernAlpaydin, “Introduction to Machine Learning”, MIT Press, 2004.
2. Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.
1. Andreas C. Müller and Sarah Guido “Introduction to Machine Learning with Python: A Guide for Data Scientists”, Oreilly.

Online Learning Resources:

- Andrew Ng, “Machine Learning Yearning”
- <https://www.deeplearning.ai/machine-learning-yearning/>
- Shai Shalev-Shwartz , Shai Ben-David, “Understanding Machine Learning: From Theory to Algorithms” .

**APPLICATIONS OF AI
III B.TECH., II SEMESTER**

Course Title: APPLICATIONS OF AI	Course Code:AS20-72PC14
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites :A Course on “Robotics & Its Applications” &“Principles of Artificial Intelligence”	

Course Overview

The term artificial intelligence broadly refers to applications of technology to perform tasks that resemble human cognitive function and is generally defined as the capability of a machine to imitate intelligent human behavior.” AI typically involves “the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. John McCarthy, one of the founders of AI research, “once defined the field as getting a computer to do things which, when done by people, are said to involve intelligence.

Course Objectives

- To impart knowledge about Applications of Artificial Intelligence.
- To give understanding of the main abstractions and reasoning for intelligent systems.
- To enable the students to understand the basic principles of Artificial Intelligence in various applications

Course Outcomes

CO#	Course Outcomes
C323.1	Understand and apply the principles of AI.
C323.2	Solve basic AI based problems.
C323.3	Define the concept of Artificial Intelligence.
C323.4	Apply AI techniques to real-world problems to develop intelligent systems.
C323.5	Select appropriately from a range of techniques when implementing intelligent systems.
C323.6	Understand reinforcement learning techniques

COURSE CONTENT

UNIT-I

AI for Driverless systems Look: The MEMEX Reloaded, Inside a Search Engine, Google and the Mind, Deeper and Darker. The Robotic chauffeur: Getting to driverless, A Cure for the deadliest disease, Seven delaying Myths, The timeline.

A Driverless World: Friction-free personal mobility, Parking, Commuting, Take the pod – meet people, Anatomy of a Driverless cars: HiTO Lgh definition digital maps, Digital Cameras, Light detection and ranging(lidar), Radio Detection and Ranging (Radar), Ultrasonic sensors(sonars), Global positioning systems (GPS), The inner ear (IMU), Drive by wire.

UNIT-II

AI for Marketing Solving the Marketing Problem: - One-to-One Marketing, One-to-Many Advertising, The Four Ps, What Keeps a Marketing Professional Awake? The Customer Journey, We Will Never Really Know, How Do I Connect? Let Me Count the Ways, Why Do I Connect? Branding, Marketing Mix Modelling, Econometrics, Customer Lifetime Value, One-to-One Marketing—The Meme, Seat-of- the-Pants Marketing, Marketing in a Nutshell, What Seems to Be the Problem?

UNIT-III

AI for Marketing continued Using AI to Get Their Attention - Market Research: Whom Are We After? Marketplace Segmentation, Raising Awareness, Social Media Engagement, In Real Life, The B2B World, Using AI to Persuade - The In-Store Experience, On the Phone, The Onsite Experience—Web Analytics, Merchandising, Closing the Deal, Back to the Beginning: Attribution.

UNIT-IV

AI for Customers Using AI for Retention - Growing Customer Expectations, Retention and Churn, Many Unhappy Returns, Customer Sentiment, Customer Service, Predictive Customer Service.

UNIT-V

AI for Image processing The role of medical image computing and machine learning in health care, Deep Learning and Machine Learning in Imaging: Basic Principles, how to develop Artificial Intelligence Applications, A Standardized Approach for preparing Imaging data for Machine Learning tasks in Radiology, Artificial Intelligence in Medicine: Validation and Study Design, Enterprise Imaging.

Textbooks:

1. Gautam Shroff “The Intelligent Web”, OXFORD University Press, 2013.
2. Hod Lipson, and Melba kurman, “Driverless_ Intelligent cars and the Road Ahead”, The MIT Press Cambridge, Massachusetts London, England, 2016.

Reference Books:

1. Jim Sterne “Artificial intelligence for Marketing”, John Wiley & sons, 2017.
2. Erik R. Ranschaert, sergey Morozov, Paul R. Algra, “Artificial Intelligence in Medical Imaging, Springer Nature Switzerland AG, 2019.

Online Learning Resources:

1. Top 14 Artificial Intelligence (AI) Applications in 2022 | Simplilearn
2. Advanced AI: Deep Reinforcement Learning with Python | Udemy

ARTIFICIAL NEURAL NETWORKS
(Professional Elective Course– II)
III B.TECH., II SEMESTER

Course Title: ARTIFICIAL NEURAL NETWORKS	Course Code:AS20-72PE21
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “Principles of artificial intelligence”	

Course Overview

The artificial neural network (ANN), or simply neural network, is a machine learning method evolved from the idea of simulating the human brain. The data explosion in modern drug discovery research requires sophisticated analysis methods to uncover the hidden causal relationships between single or multiple responses and a large set of properties. The ANN is one of many versatile tools to meet the demand in drug discovery modeling.

Course Objectives

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

Course Outcomes

CO#	Course Outcomes
C327.1	Create different neural networks of various architectures both feed forward and feed backward.
C327.2	Perform the training of neural networks using various learning rules.
C327.3	Perform the testing of neural networks and do the perform analysis of these networks
C327.4	To learn enhancement techniques using neural network
C327.5	Perform the training of data using CNN and RNN.
C327.6	perform various pattern recognition applications

COURSE CONTENT

UNIT 1

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT 2

Single Layer Perceptron’s: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT 3

Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross

Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT 4

Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM. Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT 5

Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment

Textbooks:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

Reference Books:

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligence, Li Min Fu MC GRAW HILL EDUCATION 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

Online Learning Resources:

(PDF) Artificial Neural Networks-Web course | Somnath Sengupta - Academia.edu
Top Artificial Neural Network Courses - Learn Artificial Neural Network Online | Coursera

**INTERNET OF THINGS
(Professional Elective Course– II)
III B.TECH., II SEMESTER**

Course Title: INTERNET OF THINGS	Course Code:AS20-72PE22
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A course on “ IOT “	

Course Overview

The Internet of Things (IoT) describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

Course Objectives

- To understand the basics of IOT & protocols.
- Understand the vision of IOT from global perspective
- Understand the basics of Internet of Things and protocols.
- Introduce some of the application areas where IoT can be applied. Understand the vision of IoT from a global perspective, understand its applications, determine its market perspective using gateways, devices and data management

Course Outcomes

CO#	Course Outcomes
C328.1	Understand general concepts of Internet of Things.
C328.2	Apply design concept to IoT solutions
C328.3	Analyze various M2M and IoT architectures
C328.4	Create IoT solutions using sensors, actuators and Devices
C328.5	Evaluate design issues in IoT applications
C328.6	Discuss the requirement of IoT technology

COURSE CONTENT

UNIT 1

Introduction to IoT, Definition and Characteristics of IoT, physical design of IoT, IoT protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT 2

Prototyping IoT Objects using Microprocessor/Microcontroller Lecture 9Hrs Working principles of sensors and actuators, setting up the board – Programming for IoT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

UNIT 3

IoT Architecture and Protocols Lecture 8Hrs Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, Protocols- 6LowPAN, RPL, CoAP, MQTT, IoT frameworks- Thing Speak.

UNIT 4

Device Discovery and Cloud Services for IoT Lecture 8Hrs Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IoT.

UNIT 5

UAV IoT Lecture 10Hrs Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller(ESC), GPS, IMU, Ultra sonic sensors; UAV Software – Ardupilot, Mission Planner, Internet of Drones(IoD)- Case study FlytBase.

Textbooks:

1. Vijay Madiseti and ArshdeepBahga, “ Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.

Reference Books:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “ From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
2. ArshdeepBahga, Vijay Madiseti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.
4. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013
5. Cuno Pfister, Getting Started with the Internet of Things, O’Reilly Media, 2011, ISBN: 978-1-4493- 9357-1
6. DGCA RPAS Guidance Manual, Revision 3 – 2020

Online Learning Resources:

1. <https://www.arduino.cc/>

**COMPUTER VISION
(Professional Elective Course– II)
III B.TECH., II SEMESTER**

Course Title: COMPUTER VISION	Course Code:AS20-72PE23
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48+16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “ ROBOTICS & ITS APPLICATION”	

Course Overview

Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Machines can accurately identify and locate objects then react to what they “see” using digital images from cameras, videos, and deep learning models.

Course Objectives

The objective of this course is to understand the basic issues in computer vision and major approaches to address the methods to learn the Linear Filters, segmentation by clustering, Edge detection, Texture.

Course Outcomes

CO#	Course Outcomes
C329.1	Identify basic concepts, terminology, theories, models and methods in the field of computer vision
C329.2	Describe known principles of human visual system
C329.3	Describe basic methods of computer vision related to multi-scale representation.
C329.4	Suggest a design of a computer vision system for a specific problem
C329.5	Edge detection and detection of other primitives, stereo, motion and object recognition.
C329.6	Learning different features extraction method

COURSE CONTENT

UNIT 1

LINEAR FILTERS

Introduction to Computer Vision, Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing Filters as Templates, Technique: Normalized Correlation and Finding Patterns, Technique: Scale and Image Pyramids.

UNIT 2

EDGE DETECTION

Noise- Additive Stationary Gaussian Noise, Why Finite Differences Respond to Noise, Estimating Derivatives - Derivative of Gaussian Filters, Why Smoothing Helps, Choosing a Smoothing Filter, Why Smooth with a Gaussian? Detecting Edges-Using the Laplacian to Detect Edges, Gradient-Based Edge Detectors, Technique: Orientation Representations and Corners.

UNIT 3

TEXTURE

Representing Texture –Extracting Image Structure with Filter Banks, Representing Texture using the Statistics of Filter Outputs, Analysis (and Synthesis) Using Oriented Pyramids –The Laplacian

Pyramid, Filters in the Spatial Frequency Domain, Oriented Pyramids

Application: Synthesizing Textures for Rendering, Homogeneity, Synthesis by Sampling Local Models, Shape from Texture, Shape from Texture for Planes

UNIT 4

SEGMENTATION BY CLUSTERING

What is Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction. Image Segmentation by Clustering Pixels, Segmentation by Graph- Theoretic Clustering. The Hough Transform, Fitting Lines, Fitting Curves

UNIT 5

RECOGNIZATION BY RELATIONS BETWEEN TEMPLATES

Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Models and Search, Using Classifiers to Prune Search, Hidden Markov Models, Application: HMM and Sign Language Understanding, Finding People with HMM.

Textbooks:

David A. Forsyth, Jean Ponce, Computer Vision – A modern Approach, PHI, 2003.

Reference Books:

1. Geometric Computing with Clifford Algebras: Theoretical Foundations and Applications in Computer Vision and Robotics, Springer; 1 edition, 2001 by Sommer.
2. Digital Image Processing and Computer Vision, 1/e, by Sonka.
3. Computer Vision and Applications: Concise Edition (With CD) by Jack Academy Press, 2000.

Online Learning Resources:

<https://nptel.ac.in/courses/106105216>

<https://nptel.ac.in/courses/108103174>

**NATURAL LANGUAGE PROCESSING LAB
III B.TECH., II SEMESTER**

Course Title: NATURAL LANGUAGE PROCESSING LAB	Course Code:AS20-72PC15
Teaching Scheme (L:T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “Principles of Artificial Intelligence & robotics and its Applications”	

Course Overview

The Natural Language Processing course covers concepts like statistical machine translation and neural models, deep semantic similarity models (DSSM), neural knowledge base embedding, deep reinforcement learning techniques, neural models applied in image captioning, and visual question answering with Python's Natural

Course Objectives:

To introduce the students with the basics of NLP which will empower them for developing advanced NLP tools and solving practical problems in the field.

Course Outcomes (CO):

CO#	Course Outcomes
C324.1	Understand approaches to syntax and semantics in NLP.
C324.2	Analyse grammar formalism and context free grammars
C324.3	Apply Rule based Techniques, Statistical Machine translation (SMT), word alignment, phrase- based translation
C324.4	Have the skills (experience) of solving specific NLP tasks, which may involve programming in Python,
C324.5	Learn different visualization techniques as well as running experiments on textual data
C324.6	

COURSE CONTENT

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

List of Experiments:

1. Word Analysis
2. Word Generation
3. Morphology
4. N-Grams
5. N-Grams Smoothing
6. POS Tagging: Hidden Markov Model
7. POS Tagging: Viterbi Decoding
8. Building POS Tagger
9. Chunking
10. Building Chunker

References:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Natural Language Processing, A paninian perspective, Akshar Bharathi, Vineet Chaitanya, Prentice
–Hall of India.

Online Learning Resources

/Virtual Labs:

1. Natural Language Processing in TensorFlow | Coursera
2. Refer: <https://nlp-iiith.vlabs.ac.in/List%20of%20experiments.html>

**MACHINE LEARNING LAB
III B.TECH., II SEMESTER**

Course Title: MACHINE LEARNING LAB	Course Code:AS20-72PC16
Teaching Scheme (L:T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “PRINCIPLES OF ARTIFICIAL INTELLIGENCE”	

Course Overview:

Under this subject, you will learn about the fundamentals of artificial intelligence, machine learning, various algorithms like supervised, semi-supervised, unsupervised or reinforcement learning, Neural Networks and most importantly, machine learning implementations.

Course Objectives:

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes (CO):

CO#	Course Outcomes
C325.1	Understand the Mathematical and statistical perspectives of machine learning algorithms through python programming
C325.2	Appreciate the importance of visualization in the data analytics solution.
C325.3	Derive insights using Machine learning algorithms
C325.4	Learn how to handle un-label data
C325.5	Learn supervised and un supervised learning technique
C325.6	Learn data pre-processing technique

COURSE CONTENT

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

List of Experiments:

- The programs can be implemented in either JAVA or Python.
- For Problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.
- Data sets can be taken from standard repositories (<https://archive.ics.uci.edu/ml/datasets.html>) or constructed by the students.

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.

Projects

1. Predicting the Sale price of a house using Linear regression
2. Spam classification using Naïve Bayes algorithm
3. Predict car sale prices using Artificial Neural Networks
4. Predict Stock market trends using LSTM
5. Detecting faces from image

References:

1. Python Machine Learning Workbook for beginners, AI Publishing, 2020.

Online Learning Resources/Virtual Labs:

- 1) Machine Learning A-Z (Python & R in Data Science Course) | Udemy
- 2) Machine Learning | Coursera

**APPLICATIONS OF AI LAB
III B.TECH., II SEMESTER**

Course Title: APPLICATIONS OF AI LAB	Course Code:AS20-72PC17
Teaching Scheme (L:T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “Principles of Artificial Intelligence “& “ROBOTICS AND ITS APPLICATIONS”	

Course Overview:

Artificial intelligence is a science and technology based on disciplines such as Computer Science, Biology, Psychology, Linguistics, Mathematics, and Engineering. A major thrust of AI is in the development of computer functions associated with human intelligence, such as reasoning, learning, and problem solving.

Course Objectives:

To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements. To have an appreciation for the engineering issues underlying the design of AI systems. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. To understand the basic issues of knowledge representation and blind and heuristic search, as well as an understanding

Course Outcomes:

CO#	Course Outcomes
C326.1	Develop systems that process unstructured, unstructured data automatically using artificial intelligence (AI) frameworks.
C326.2	Determine the framework in which AI bots may function, including interactions with users and environments.
C326.3	Design and implement cognitive automation for different industries.
C326.4	Understand and identify changes in traffic flow so that it can recommend the route that avoids roadblocks and congestion.
C326.5	Designing self automated systems.
C326.6	Designing of unstructured data handling systems.

COURSE CONTENT

List of Experiments:

Design an application using machine learning algorithms that remember the edges of the buildings that it has learned, which allows for

1. Maps and Navigation

AI has drastically improved traveling. Instead of having to rely on printed maps or directions, you can now use Google Maps on your phone and type in your destination.

So how does the application know where to go? And what’s more, the optimal route, road barriers, and traffic congestions? Not too long ago, only satellite-based GPS was available, but now, artificial intelligence is being incorporated to give users a much more enhanced experience.

2. Facial Detection and Recognition

A. Design an application that can be used for Face detection. B. Design an application that can identify the face.

3. Text Editors or Autocorrect
 - A. Design an algorithm that can give autosuggestions in a word processor.
 - B. Design an algorithm to detect spelling and grammar errors in a text document.
4. Search and Recommendation Algorithms
Design a recommender system which keeps track of the previous shopping data of the user and recommends other products based on his interests.
5. Chatbots
 - A. Design an AI chatbot which provides information about your college.
 - B. Design an AI chatbot which permits the user to install a software of your choice
6. Digital Assistants
Design a Digital assistant of your choice. Example is the digital assistant which plays a song when you say play song xxx.mp3.
7. Social Media
Design an application which detects Fake news.
Design an application which finds most viewed news.
8. Image Processing
Design an application which detects the emotion of the person in an image.

References:

1. Gautam Shroff “The Intelligent Web”, OXFORD University Press, 2013.
2. Hod Lipson, and Melba kurman, “Driverless_ Intelligent cars and the Road Ahead”, The MIT Press Cambridge, Massachusetts London, England, 2016.
3. Erik R. Ranschaert, sergey Morozov, Paul R. Algra, “Artificial Intelligence in Medical Imaging, Springer Nature Switzerland AG, 2019.

Online Learning Resources/Virtual Labs:

1. AI and Improving the Customer Experience| Pega

**INTELLECTUAL PROPERTY RIGHTS AND PATENTS
(MANDATORY COURSE)
III B.TECH., II SEMESTER**

Course Title: INTELLECTUAL PROPERTY RIGHTS AND PATENTS	Course Code:AS20-00MC07
Teaching Scheme (L:T:P): 2:0:0	Credits: 0
Type of Course:	Total Contact Periods: 32 Hrs.
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites : :A Course on “ UNIVERSAL HUMAN VALUES-II”	

Course Overview:

Intellectual property rights (IPR) have been defined as ideas, inventions, and creative expressions based on which there is a public willingness to bestow the status of property. IPR provide certain exclusive rights to the inventors or creators of that property, in order to enable them to reap commercial benefits from their creative efforts or reputation. There are several types of intellectual property protection like patent, copyright, trademark, etc. Patent is a recognition for an invention, which satisfies the criteria of global novelty, non-obviousness, and industrial application.

Course Objectives:

This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws, Cyber Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations.

Course Outcomes:

CO#	Course Outcomes
C3211.1	Understand IPR law & Cyber law
C3211.2	Discuss registration process, maintenance and litigations associated with trademarks
C3211.3	Illustrate the copy right law
C3211.4	Enumerate the trade secret law
C3211.5	Intellectual Property Law Basics
C3211.6	Agencies Responsible for Intellectual Property

COURSE CONTENT

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property –Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Overuse or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law-Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements –Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance –Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation –Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law. Introduction to Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

Textbooks:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal “Fundamentals of IPR for Engineers”, BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections.

References:

1. Prabhuddha Ganguli: ‘ Intellectual Property Rights’ Tata Mc-Graw – Hill, New Delhi
2. Richard Stim: “Intellectual Property”, Cengage Learning, New Delhi.
3. R. Radha Krishnan, S. Balasubramanian: “Intellectual Property Rights”, Excel Books. New Delhi.
4. M. Ashok Kumar and Mohd. Iqbal Ali: “Intellectual Property Right” Serials Pub.

**PROFESSIONAL ETHICS
III B.TECH., II SEMESTER
MANDATORY COURSE**

Course Title: PROFESSIONAL ETHICS	Course Code: AS20-00MC04
Teaching Scheme (L:T:P) : 3:0:0	Credits:0
Type of Course: Lecture	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks
Prerequisites <ol style="list-style-type: none"> 1. Understand the professional Rules of conduct for Engineers. 2. Appreciate codes of conduct, professional Rules of conduct. 3. Recognize the conflict of interest and Develop strategies 4. Understand the importance of communication with all stakeholders. 5. Apply practical strategies for handling ethical dilemmas. 	

Course Overview:

To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives.

Course Objective

- To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives.
- To understand the importance of Values and Ethics in their Personal lives and professional careers.
- To know the basic theory of moral development and ethics
- To learn the rights and responsibilities of personal and professional life.
- To study the Responsibilities of employee, team member and a global citizen.
- To understand the professional practices in engineering

Course Outcomes(s)

CO#	Course Outcomes
C329.1	To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.
C329.2	To understand the importance of Values in professional life.
C329.3	To understand Ethics in their Personal lives and professional careers.
C329.4	To learn the rights and responsibilities.
C329.5	To improve the Responsibilities of employee.
C329.6	To analyse the responsibilities of team member and a global citizen.

COURSE CONTENT

UNIT - I

Introduction to Business and Economics: Business: Nature and scope of business, Structure of Business Firm, Theory of Firm, Types of Business Entities, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: The themes of economics, scarcity and efficiency, three fundamental economic problems, society's capability, Production possibility frontiers (PPF),

Productive efficiency Vs economic efficiency, economic growth & stability, Micro economies and Macro economies, relationship between micro, macro and managerial economics with other discipline, the role of markets and government, Positive Vs negative externalities.

UNIT - II

Demand and Supply Analysis: Determinants of demand and supply, Demand and Supply Function, Law of Demand and supply, Elasticity of Demand and supply, Types of Elasticity, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making,

Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Case study.

UNIT - III

Production Analysis: Factors of Production, Production Function concepts, law of variables proportion, Returns to Scale, Different Types of Production Functions. Cost analysis: different Costs concepts, Short run and Long run Cost Functions, Revenue curves of firms.

Market Structures: Market classification, Perfect and imperfect competition, Monopoly, Monopolistic competition, Duopoly, Oligopoly. Pricing methods and strategies: Objectives, Factors, General consideration of pricing, methods of pricing, Dual pricing, Price discrimination. Product Life Cycle based Pricing, Break Even Analysis. Case study

UNIT - IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance subsidiary book, Elements of Financial Statements, and Preparation of Final Accounts. Problems

UNIT - V

Financial Analysis through Ratios: Concept of Ratio Analysis, importance of ratio Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS

1. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. I.M .Pandey, Financial Management, Vikas Publishing House. New Delhi.

REFERENCE BOOKS

1. Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011
2. Yogesh, Maheswari, Management Economics, PHI learning, New Delhi, 2012.
3. Karl E. Case and Ray C. Fair, Principles of Economics, Pearson Education Inc., 8th Edition, 2007.
4. Dominick Salvatore, Theory and Problems of Micro Economic Theory. Tata Mac GrawHill, New Delhi.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):

NPTEL Web Course:

1. https://onlinecourses.nptel.ac.in/noc19_hs28/preview
2. https://onlinecourses.nptel.ac.in/noc19_ma07/preview
3. https://onlinecourses.nptel.ac.in/noc19_mg01/preview

NPTEL Video Course:

1. <https://www.youtube.com/watch?v=51-nXPx3cw4&list=PLbMVogVj5nJTG7ahmEJc4MlcGT0hCr5ik>
2. <https://www.youtube.com/watch?v=vLPpF0hunwc&list=PLbMVogVj5nJRTAVF4-tueujAFiLKIV3Mo>

WEB REFERENCE/E-BOOKS:

1. www.icsi.edu
2. <https://www.inderscience.com/jhome.php?jcode=gber>
https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CAESQeD2u1_CESbm6r_whRhIZ_S92_I0pg_v9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEt7Rm_TvoMTMUwkt98PF&sig=AOD64_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVjzDgGHXDgDFAQ0Qx6BAgCEAE

ENVIRONMENTAL ECONOMICS
(Open Elective II) III B.TECH., II SEMESTER

Course Objective

- To impart knowledge on sustainable development and economics of energy
- To teach regarding environmental degradation and economic analysis of degradation
- To inculcate the knowledge of economics of pollution and their management
- To demonstrate the understanding of cost benefit analysis of environmental resources
- To make the students to understand principles of economics of biodiversity

Course Outcomes :

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

CO#	Course Outcomes
C329.1	The information on sustainable development and economics of energy
C329.2	The information regarding environmental degradation and economic analysis of degradation
C329.3	The identification of economics of pollution and their management
C329.4	The cost benefit analysis of environmental resources
C329.5	The principles of economics of biodiversity
C329.6	

COURSE CONTENT

UNIT I

Sustainable Development: Introduction to sustainable development - Economy-Environment inter- linkages - Meaning of sustainable development - Limits to growth and the environmental Kuznets curve – The sustainability debate - Issues of energy and the economics of energy – Nonrenewable energy, scarcity, optimal resources, backstop technology, property research, externalities, and the conversion of uncertainty.

UNIT II

Environmental Degradation: Economic significance and causes of environmental degradation – The concepts of policy failure, externality and market failure - Economic analysis of environmental degradation – Equi –marginal principle.

UNIT - III

Economics of Pollution: Economics of Pollution - Economics of optimal pollution, regulation, monitoring and enforcement - Managing pollution using

existing markets: Bargaining solutions – Managing pollution through market intervention: Taxes, subsidies and permits.

UNIT IV

Cost – Benefit Analysis: Economic value of environmental resources and environmental damage - Concept of Total Economic Value - Alternative approaches to valuation – Cost-benefit analysis and discounting.

UNIT V

Economics of biodiversity: Economics of biodiversity conservation - Valuing individual species and diversity of species -Policy responses at national and international levels. Economics of Climate Change – stern Report

Textbooks:

1. An Introduction to Environmental Economics by N. Hanley, J. Shogren and B. White Oxford University Press.(2001)
2. Blueprint for a Green Economy by D.W. Pearce, A. Markandya and E.B. Barbier Earthscan, London.(1989)

Reference Books:

1. Environmental Economics: An Elementary Introduction by R.K. Turner, D.W. Pearce and I. Bateman Harvester Wheatsheaf, London. (1994),
2. Economics of Natural Resources and the Environment by D.W. Pearce and R.K. Turner Harvester Wheat sheaf, London. (1990),
3. Environmental and Resource Economics: An Introduction by Michael S. Common and Michael Stuart 2ndEdition, Harlow: Longman.(1996),
4. Natural Resource and Environmental Economics by Roger Perman, Michael Common, Yue Ma and James Mc Gilvray 3rdEdition, Pearson Education.(2003),

Online Learning Resources:

<https://nptel.ac.in/courses/109107171>

INTROUDUCTION TO ROBOTICS

Course Objectives: Learn the fundamental concepts of industrial robotic technology.

- Apply the basic mathematics to calculate kinematic and dynamic forces in robot manipulator.
- Understand the robot controlling and programming methods.
- Describe concept of robot vision system

Course Outcomes:

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

- Explain fundamentals of Robots
- Apply kinematics and differential motions and velocities
- Demonstrate control of manipulators
- Understand robot vision
- Develop robot cell design and programming

UNIT I Fundamentals of Robots

Introduction, definition, classification and history of robotics, robot characteristics and precision of motion, advantages, disadvantages and applications of robots. Introduction to matrix representation of a point in a space a vector in space, a frame in space, Homogeneous transformation matrices, representation of a pure translation, pure rotation about an axis.

UNIT II Kinematics, Differential motions and velocities of robot

Kinematics of robot: Forward and inverse kinematics of robots- forward and inverse kinematic equations for position and orientation, Denavit-Hartenberg(D-H) representation of forward kinematic equations of robots, the inverse kinematic of robots, degeneracy and dexterity, simple problems with D-H representation.

Differential motions and Velocities: Introduction, differential relationship, Jacobian, differential motions of a frame-translations, rotation, rotating about a general axis, differential transformations of a frame. Differential changes between frames, differential motions of a robot and its hand frame, calculation of Jacobian, relation between Jacobian and the differential operator, Inverse Jacobian.

UNIT III Control of Manipulators

Open- and close-loop control, the manipulator control problem, linear control schemes, characteristics of second-order linear systems, linear second-order SISO model of a manipulator joint, joint actuators, partitioned PD control scheme, PID control Scheme, computer Torque control, force control of robotic manipulators, description of force-control tasks, force control strategies, hybrid position/force control, impedance force/torque control.

UNIT IV Robot Vision

Introduction, architecture of robotic vision system, image processing, image acquisition camera, image enhancement, image segmentation, imaging transformation, Camera transformation and calibrations, industrial applications of robot vision.

UNIT V Robot Cell Design and Programming

Robot cell layouts-Robot centred cell, In-line robot cell, considerations in work cell design, work cell

control, interlocks, error detection, work cell controller. methods of robot programming, WAIT, SIGNAL, and DELAY commands, Robotic languages, VAL system.

Textbooks:

1. Mikell P. Groover and Mitchell Weiss, Roger N. Nagel, Nicholas G. Odrey ,
Industrial

Robotics — Mc Graw Hill, 1986.

2. R K Mittal and I J Nagrath, Robotics and control, Illustrated Edition, Tata McGraw Hill
India

2003.

References:

1. Saeed B. Niku, Introduction to Robotics – Analysis, System, Applications, 2nd Edition,
John

Wiley & Sons, 2010.

SIGNAL PROCESSING
(Open Elective II)III B.TECH., II SEMESTER

Course Title: INTRODCUTION TO ROBOTICS	Course Code:
Teaching Scheme (L:T:P): 0:0:3	Credits: 3
Type of Course:	Total Contact Periods:
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A COURSE ON “ ELECTRONIC DEVICES & CIRCUITS “	

COURSE OBJECTIVE :

Understand, represent and classify continuous time and discrete time signals and systems, together with the representation of LTI systems.

- Ability to represent continuous time signals (both periodic and non-periodic) in the time domain, sdomain and the frequency domain
- Understand the properties of analog filters, and have the ability to design Butterworth filters
- Understand and apply sampling theorem and convert a signal from continuous time to discrete time or from discrete time to continuous time (without loss of information)
- Able to represent the discrete time signal in the frequency domain
- Able to design FIR and IIR filters to meet given specifications

Course Outcomes:

- Understand and explain continuous time and discrete time signals and systems, in time and frequency domain
- Apply the concepts of signals and systems to obtain the desired parameter/representation
- Analyse the given system and classify the system/arrive at a suitable conclusion
- Design analog/digital filters to meet given specifications
- Design and implement the analog filter using components/ suitable simulation tools
- Design and implement the digital filter using suitable simulation tools, and record the input and output of the filter for the given audio signal

UNIT I

Signal Definition, Signal Classification, System definition, System classification, for both continuous time and discrete time. Definition of LTI systems

UNIT II

Introduction to Fourier Transform, Fourier Series, Relating the Laplace Transform to Fourier Transform, Frequency response of continuous time systems

UNIT III

Frequency response of ideal analog filters, Salient features of Butterworth filters Design and implementation of Analog Butterworth filters to meet given specifications

UNIT IV

Sampling Theorem- Statement and proof, converting the analog signal to a digital signal. Practical

sampling. The Discrete Fourier Transform, Properties of DFT. Comparing the frequency response of analog and digital systems.

UNIT V

Definition of FIR and IIR filters. Frequency response of ideal digital filters

Transforming the Analog Butterworth filter to the Digital IIR Filter using suitable mapping

techniques, to meet given specifications. Design of FIR Filters using the Window technique, and the frequency sampling technique to meet given specifications Comparing the designed filter with the desired filter frequency response

Textbooks:

1. 'Signals and Systems', by Simon Haykin and Barry Van Veen, Wiley.

References:

1. 'Theory and Application of Digital Signal Processing', Rabiner and Gold
2. 'Signals and Systems', Schaum's Outline series
3. 'Digital Signal Processing', Schaum's Outline series

BASIC VLSI DESIGN
(Open Elective II) III B.TECH., II SEMESTER

Course Title: BASIC VLSI DESIGN	Course Code:
Teaching Scheme (L:T:P): 0:0:3	Credits: 3
Type of Course:	Total Contact Periods:
Continuous Internal Evaluation: 30 Marks	Semester End Exams : 70 Marks
Prerequisites : A Course on “ELECTRONIC DEVICES AND CIRCUITS” & “DIGITAL ELECTRONICS”	

Course Objectives:

- Understand the fundamental aspects of circuits in silicon
- Relate to VLSI design processes and design rules

Course Outcomes:

- Identify the CMOS layout levels, and the design layers used in the process sequence.
- Describe the general steps required for processing of CMOS integrated circuits.
- Design static CMOS combinational and sequential logic at the transistor level.
- Demonstrate different logic styles such as complementary CMOS logic, pass-transistor Logic, dynamic logic, etc.
- Interpret the need for testability and testing methods in VLSI.

UNIT I

Moore’s law, speed power performance, nMOS fabrication, CMOS fabrication: n-well, pwell processes, BiCMOS, Comparison of bipolar and CMOS. Basic Electrical Properties of MOS And BiCMOS Circuits: Drain to source current versus voltage characteristics, threshold voltage, transconductance.

UNIT II

Basic Electrical Properties of MOS And BiCMOS Circuits: nMOS inverter, Determination of pull up to pull down ratio: nMOS inverter driven through one or more pass transistors, alternative forms of pull up, CMOS inverter, BiCMOS inverters, latch up. Basic Circuit Concepts: Sheet resistance, area capacitance calculation, Delay unit, inverter delay, estimation of CMOS inverter delay, super buffers, BiCMOS drivers.

UNIT III

MOS and BiCMOS Circuit Design Processes: MOS layers, stick diagrams, nMOS design style, CMOS design style Design rules and layout & Scaling of MOS Circuits: λ - based design rules, scaling factors for device parameters

UNIT IV

Subsystem Design and Layout-1: Switch logic pass transistor, Gate logic inverter, NAND gates, NOR gates, pseudo nMOS, Dynamic CMOS Examples of structured design: Parity generator, Bus arbitration, multiplexers, logic function block, code converter.

UNIT V

Subsystem Design and Layout-2: Clocked sequential circuits, dynamic shift registers, bus lines, General considerations, 4-bit arithmetic processes, 4-bit shifter, Regularity Definition & Computation Practical aspects and testability: Some thoughts of performance, optimization

and CAD tools for design and simulation.

Textbooks:

1. “Basic VLSI Design”, Douglas A Pucknell, Kamran Eshraghian, 3 rd Edition, Prentice Hall of India publication, 2005.

References:

1. “CMOS Digital Integrated Circuits, Analysis And Design”, Sung – Mo (Steve) Kang, Yusuf Leblebici, Tata McGraw Hill, 3 rd Edition, 2003.
2. “VLSI Technology”, S.M. Sze, 2nd edition, Tata McGraw Hill, 2003

