Sunrise University

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Recognized by UGC Act, 1956 u/s 2 (f)

INFORMATION TECHNOLOGY

(IT)

SEMESTER I

Subject Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
Personality Development Programfor First 15th Days										
THEORY										
1D01	English &Communication Skills	2	0	0	3	10	10	20	60	100
1D02	Applied Chemistry-I	3	1	0	3	10	10	20	60	100
1D03	Applied Physics-I	3	1	0	3	10	10	20	60	100
1D04	Applied Mathematics-I	4	1	0	3	10	10	20	60	100
1D05	Computer Fundamental & Information Technology	3	1	0	3	10	10	20	60	100
Code	**Subject**	**Hrs. /Week**			**Exam Hrs.**	**IA (60%)**		**EA (40%)**		**Total**
		L	**T**	**P**		**MP1 (30%)**	**MP2 (30%)**			
1D06	Applied Chemistry Lab-I	0	0	2	2	30	30	40		100
1D07	Applied Physics Lab-I	0	0	2	2	30	30	40		100
1D08	Computer Fundamental & IT Lab I	0	0	2	2	30	30	40		100
1D09	Engineering Drawing	0	0	3	3	30	30	40		100
1D10	Workshop Practice – I	0	0	3	3	30	30	40		100
	TOTAL	**15**	**04**	**12**						**1000**

SEMESTER II

Subject Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
2D01	Applied Chemistry-II	3	1	0	3	10	10	20	60	100
2D02	Applied Physics-II	3	1	0	3	10	10	20	60	100
2D03	Applied Mathematics-II	4	1	0	3	10	10	20	60	100
2D04	Electrical & Electronics Technology	3	1	0	3	10	10	20	60	100
2D05	Applied Mechanics	3	1	0	3	10	10	20	60	100
Code	**Subject**	**Hrs. /Week**			**Exam Hrs.**	**IA (60%)**		**EA (40%)**		**Total**
		L	**T**	**P**		**MP1 (30%)**	**MP2 (30%)**			
2D06	Applied Chemistry Lab-II	0	0	2	2	30	30	40		100
2D07	Applied Physics Lab-II	0	0	2	2	30	30	40		100
2D08	Electrical & Electronics Workshop	0	0	2	2	30	30	40		100
2D09	Workshop Practices-II	0	0	2	3	30	30	40		100
2D10	Computer Fundamental & IT Lab-II	0	0	2	2	30	30	40		100
	TOTAL	**16**	**05**	**10**						**1000**

SEMESTER III

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
3DIT01	Computer Programming	3	1	0	3	10	10	20	60	100
3DIT02	ICT Resources	3	1	0	3	10	10	20	60	100
3DIT03	Data Structures	3	1	0	3	10	10	20	60	100
3DIT04	Computer Architecture	3	1	0	3	10	10	20	60	100
3DIT05	Algorithms	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA(60%)			
		L	T	P		MP1 (30%)	MP2 (30%)	EA(60%)	Total
3DIT07	Computer Programming Lab	0	0	2	3	30	30	40	100
3DIT08	ICT Resources Lab	0	0	2	3	30	30	40	100
3DIT09	Data Structures Lab	0	0	2	3	30	30	40	100
3DIT10	Summer Internship – I (4 weeks after II Sem.)	0	0	2	3	60	60	80	200
	GRAND TOTAL	**18**	**05**	**10**					**1000**

SEMESTER IV

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
4DIT01	Operating Systems	3	1	0	3	10	10	20	60	100
4DIT02	Introduction to DBMS	3	1	0	3	10	10	20	60	100
4DIT03	Computer Networks	3	1	0	3	10	10	20	60	100
4DIT04	SSAD/Software Engineering	3	1	0	3	10	10	20	60	100
4DIT05	C++ Programming	3	1	0	3	10	10	20	60	100
4DIT06	**Programme Elective-I** ***IT 40061- Information Security ^^IT 40062- Cyber Laws	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA(60%)		EA(40%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
4DIT07	Operating Systems Lab	0	0	2	3	30	30	40	100
4DIT08	Introduction to DBMS Lab	0	0	2	3	30	30	40	100
4DIT09	Computer Networks Lab	0	0	2	3	30	30	40	100
4DIT10	C++ Programming Lab	0	0	2	3	30	30	40	100
	GRAND TOTAL	**18**	**5**	**8**					**1000**

SEMESTER V

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
5DIT01	Introduction to e-Governance	3	1	0	3	10	10	20	60	100
5DIT02	Internet of Things	3	1	0	3	10	10	20	60	100
5DIT03	**Open Elective-I** **+IT 51001-** Economic Policies in India **+IT 51002-** Engineering Economics & Accountancy	3	1	0	3	10	10	20	60	100
5DIT04	Data Sciences: Data Warehousing andData Mining	3	1	0	3	10	10	20	60	100
5DIT05	**Programme Elective – III** ***IT50041-** Advance Computer Networks **IT50042-** Cloud Computing	3	1	0	3	10	10	20	60	100
5DIT06	Programming in Java	3	1	0	3	10	10	20	60	100

		Hrs. /Week			Exam Hrs.	IA (60%)		EA(40%)	Total
Code		**L**	**T**	**P**		**MP1 (30%)**	**MP2 (30%)**		
5DIT07	Data Sciences: Data Warehousing andData Mining Lab	0	0	2	3	30	30	40	100
5DIT08	Programming in JavaLab	0	0	2	3	30	30	40	100
5DIT09	Summer Internship – II (6 weeks after IV Sem)	0	0	2	3	60	60	80	200
	GRAND TOTAL	**18**	**5**	**10**					**1000**

SEMESTER VI

Code	Subject	Hrs. /Week			Exam Hrs.	Maximum Marks				
		L	T	P		MS1	MS2	IA	Th.	Total
THEORY										
6DIT01	Entrepreneurship and Start-ups	3	1	0	3	10	10	20	60	100
6DIT02	**Open Elective-II** +IT 62001- Project Management +IT 62002- Renewable Energy Technologies	3	1	0	3	10	10	20	60	100
6DIT03	**Open Elective-III** +IT 63001- Product Design +IT 63002- Disaster Management	3	1	0	3	10	10	20	60	100
6DIT04	Indian Constitution	3	1	0	3	10	10	20	60	100
6DIT05	**Programme Elective IV IT60011-** .Dot Net Technology *__IT60012-__ Software Testing	3	1	0	3	10	10	20	60	100

Code		Hrs. /Week			Exam Hrs.	IA (60%)		EA(40%)	Total
		L	T	P		MP1 (30%)	MP2 (30%)		
6DIT06	**Programme Elective IV-LabIT 60021-Dot** Net Technology *__IT 60022-__ Software Testing Lab	0	0	2	3	30	30	40	100
6DIT07	Seminar	0	0	2	3	60	60	80	200
6DIT08	Major Project	0	0	2	3	60	60	80	200
	GRAND TOTAL	**18**	**5**	**6**					**1000**

Semester-I		
1D01: English Communication &Skils-I		
Objective: English communication encompasses written, oral, visual and digital communication within a workplace context. This discipline blends together pedagogical principles of rhetoric, technology, and software to improve communication in a variety of settings ranging from technical writing to usability and digital media design.		
Unit	**Topic**	**35hrs**
Unit – I	Narration, Voice, Basic Sentence Patterns. (Nine basic sentence patterns) Tenses, Common errors (Noun, Pronoun, Articles, Adverb, Punctuation, Preposition etc.) Transformation of Sentences, Determiners, Preposition	**5**
Unit – II	Modals in Conversational Usage, Prefix, Suffix, Idioms & Phrasal verbs : **Modals** Can, Could, Should,Will, Would, May, Might, Must, Need not, Dare not, Ought to, Used to. **Phrases** At all; Instead of; In Spite of; As well as; Set up; Upset; Look up; Call off; Call out; Come across; Set right; Look other. **Idioms** Work up (excite); Break down; Stand up for; Turn down; Pass away; Pass on; Back up; Back out; Carry out; Done for (ruined); Bring about; Go through; Ran over; Look up (improve); Pick out (selected).	**8**
Unit – III	Composition - . Unseen Passage, Précis Writing Letter Writing : Letter to the editor of a magazine, newspaper, business letters, letters to relatives, friends, government officers. Report Writing Paragraph Writing, Essay Writing - Essays on general and local topics related to environmental problems	**6**
Unit – IV	**Listening:** For improving listening skills the following steps arerecommended, Listen to Prerecorded Tapes, Reproduce Vocally what has been heard, Reproduce in Written form. Summaries the text heard, Suggest Substitution of Words and Sentences, Answer Questions related to the taped text, Summaries in Writing **Vocabulary:** Synonyms. Homonyms. Antonyms and Homophones**,** Words often confused, as for example, I-me; your-yours; its-it's; comprehensible-comprehensive; complement-compliment] Context-based meanings of the words, for example, man[N] man[vb]; step[|N| ,step[vb] conflict _____Israel Palestinian conflict Emotional conflict, Ideas conflict learn ——— learn at this school I learnt from the morning news **Group Discussion :** Developing skill to initiate a discussion [How to open] Snatching initiative from others [Watch for weak points, etc.]	**8**
Unit – V	**Speaking:** Introducing English consonant-sounds and vowel-sounds.**,** Remedial exercises where necessary**,** Knowing Word stress**,** Shifting word stress in poly-syllabic words[For pronunciation practice read aloud a Para or page regularlywhile others monitor] **Delivering Short Discourses:** About one selfDescribing a Place, Person, ObjectDescribing a Picture, Photo. **Expand a topic-sentence into 4-5 sentence narrative.** **Note :** 1. The Medium of teaching and examination will be English.	**8**

	2. The Question on Essay Writing (Unit-7) will be compulsory. The student will have to attempt one essay out of two, touching the given points on general/ local topic related to environmental problems. 3. At least on question will be set from each unit. 4. No theory question will be set from syllabus of practicals.	
	Text Books : 1. Intermediate English Grammar Raymond Murphy,Pub: Foundation Books,New Delhi 2. Eng. Grammar, usage & Composition Tickoo& Subramanian Pub: S.Chand and Co. 3. Living Eng. Structure Stannard Alien. Pub: Longman 4. A Practical Eng. Grammar Thomson and Martinet. (and its Exercise Books) Pub : ELBS 5. High School English Grammar Wren & Martin. and Composition **Reference Book :** 1. Communicative Skills for Engineers and Scientists by Sangita Sharma and Binod Sharma, New Delhi : Pearson. 2. English for Engineers by Abidi&Ritu, New Delhi : Cengage Learning.	

1D02: Applied Chemistry-I		
Objective	**Chemistry** is the science of matter, especially its chemical reactions, but also its composition, structure and properties. Chemistry is concerned with atoms and their interactions with other atoms, and particularly with the properties of chemical bonds.	
	Topic	**38 Hours**
Unit – I	**Atomic Structure**: Constituents of the Atom, Bohr's Model of the Atom, Quantum Number and Electronic Energy Levels , Aufbau's Principle, Pauli's Exclusion Principle, Hund's Rule, $n + l$ Rule ,Electronic Configuration of Elements (s,p,d Block Elements) **Development of Periodic Table:** Modern Periodic Law, Long form of Periodic Table. Study of Periodicity in Physical and Chemical Properties with, special reference to Atomic and Ionic Radii, Ionisation, Potential. Electron Affinity. Electro negativity. Variation of Effective Nuclear Charge in a Period. Metallic Character.	**8**
Unit – II	**Electro Chemistry:** Ionization, Degree of Ionization, Factors which Influence Degree of Ionization . Hydrolysis – Degree of Hydrolysis, Hydrolysis Constant., pH Value, Buffer Solution Electrolysis, Faraday's Laws of Electrolysis	**8**
Unit – III	**Kinetic Theory of Gases:** Postulates of kinetic Theory**,** Ideal Gas Equation, Pressure and Volume Corrections, Vender**.** Walls Equations**,** Liquefaction of Gases, Critical Pressure and Critical Temperature**,** for Liquefaction.**,** Liquefaction of Gases by Joule – Thomson Effect,Claude's Method and Linde's Method **Carbon Chemistry:** Definition of Organic Chemistry. Difference between Organic and Inorganic Compounds. Classification and Nomenclature - Open Chain and Closed Chain Compounds, IUPAC System of Nomenclature. (upto C5).	**8**
Unit – IV	**Metals and Alloys:** General Principles and Terms listed in Metallurgy, Metallurgy of Iron and Steel, Different forms of Iron, Effect of Impurities on Iron and Steel 6.5 Effect of Alloying Elements in Steel **Pollution:** Water Pollution, Causes and Effects, Treatment of Industrial Water Discharges -Screening, Skimming and Sedimentation Tanks, Coagulation, Reductions, Chlorination, Biological Methods. Air Pollution Causes and Effects Control Methods – Electrostatic Precipitator, Scrubbers, Gravitational Setting Methods, by Plants. Awareness on	**8**
Unit – V	**Water:** Sources of Water**,** Hardness of Water.**,** Degree of Hardness, Estimation of Hardness by EDTA method,Problems on Calculation of Hardness**,**Disadvantages of Hardness**,** Softening Methods**,** Lime-Soda Method**,** Permutite Method**,** Ion -Exchange Method Problems on Softening of Water**,** Drinking Water, its Requisites, Purification and Sterilization ofWater.	**6**

	Text Books: **1.**Engineering Chemistry II (Hindi) Mathur and Agarwal 2. Chemistry of Engineering Materials C.V. Agarwal 3. Engineering Chemistry P.C. Jain and Monika 4. Chemistry M.M. Uppal 5.Applied Chemistry (Hndi) V.P.Mehta Jain Bros. Jodhpur **Reference Books:** 1 Instrumental methods of Chemical analysis, MERITT & WILLARD (EAST – WEST press) 2 Physical Chemistry , P.W Atkin (ELBS, OXFORD Press) 3 Physical Chemistry W.J.Moore (Orient Longman)	

1D03: Applied Physics-I

Objective: physics employs mathematical models and abstractions of physics to rationalize, explain and predict natural phenomena. This is in contrast to experimental physics, which uses experimental tools to probe these phenomena.

Unit	Topic	36 Hours
Unit – I	**Units and Dimensions :** Idea of various systems of units, SI units Basic, Supplementary and Derived Units, Prefixes & Symbols, Dimensions and Dimensional Formulae**,** Principle of Homogeneity of Dimensions**,** Dimensional Analysis**,** Applications and Limitations **Elasticity :** Elasticity**,** Stress and Strain**,** Elastic Limit & Hooke's law**,** Young's Modulus,Bulk Modules & Modulus of Rigidity,Poisson's Ratio	**8**
Unit – II	**Properties of Liquids:** Surface Tension & Surface Energy**,** Cohesive & Adhesive Force,Angle of Contact**,** Capillarity & Expression for Surface Tension **,** Streamline & Turbulent Flow**,** Reynold Number,Viscosity& Coefficient of Viscosity. Stoke's law & Terminal Velocity	**8**
Unit – III	**Sound Waves:** Velocity of Sound Waves: Newton's Formula , Laplace Correction ,Factors affecting Velocity of Sound Waves Propagation of Progressive Wave, Displacement, Velocity and ,Acceleration of a particle during propagation of wave Superposition of Waves: Stationary Waves (without mathematical analysis) Resonance tube	**8**
Unit – IV	**Gravitation & Satellites:** Newton's law of Gravitation, Acceleration due to Gravity Kepler's laws of Planetary Motion (statement only), Artificial Satellite (simple idea), Geo-Stationary Satellites, Escape Velocity.Velocity& Time Period of an Artificial Satellite. **Transfer of Heat:** Modes of Transmission of Heat - Idea of Conduction, Convection & Radiation, Thermal Conductivity & Coefficient of Thermal Conductivity Black Body,Kirchoff's Laws & Stefan Boltzmann Law (statement only), Newton's Law of Cooling & its Derivation from Stefan's Law	**6**
Unit – V	**Electrostatics:** Coulomb's Law**,** Intensity of Electric Field, Intensity due to a Point Charge**,** Electric Lines of Forces & Electric Flux**,** Electric Potential, Electric Potential due to a Point Charge **D.C. Circuits :** Resistivity, Effect of Temperature on Resistance , Ohm's Law, Resistance in Series and Parallel and their Combination Kirchoff's Law Wheatstone Bridge Meter Bridge Principle of Potentiometer	**6**
	Suggested Text Books: 1.Engineering Physics Gaur & Gupta (hindi) 2. Applied Physics Vol.-I Hari Harlal, NITTTR 3. Applied Physics Vol.-II Hari Harlal, NITTTR 4,Modern Engineering Physics – A.S. Vasudeva (S. Chand) 5,Solid State Physics : Kittel **Suggested Reference Book:** **1** Solid State Physics: S. O. Pillai, Wiley Eastern Ltd. **2.**Physics Vol-I & II – Resnick & Halliday (Wiley Eastern) 3.A Text Book of Optics – Brij Lal &Subramanyam	

1D04: Applied Mathematics-I

Objective: We can use of abstraction and logicalreasoning, mathematics developed from counting, calculation, measurement, and the systematic study of the shapes and motions of physical objects. Practical mathematics has been a human activity for as far back as written records exist.

Unit	Topic	35 Hours
Unit – I	**Matrices and Determinants:** Definition and Properties of Determinants**,** Definition and Types of Matrix**,** Transpose of a Matrix, Symmetric, Skew Symmetric Matrices, Orthogonal matrices, Hermitian and Skew Hermitian, Minors and Cofactors, Adjoint and Inverse of a Matrix, Cramer's Rule,Solution of Simultaneous Linear Equations by Inverse Matrix Method.,Characteristic Matrix, Characteristic Equation, Eigen Values & Vectors, Cayley Hamilton Theorem (verification only)	6
Unit – II	**Trigonometry:** Allied Angle(sin (180±A), sin (90±A) etc., Sum and Difference Formula (without proof) and their Application, Product Formula and C-D Formula, T-Ratios of Multiple and Sub-Multiple Angles (2A, 3A, A/2), Solution of Trigonometric Equations : sin X = 0, tan X = 0, cos X = 0, sin X=A, cos X =A & tan x = A	6
Unit – III	**Introduction to Different Types of Expansion:** Factorial Notation, Meaning of C(n, r), P(n, r), Binomial Theorem for Positive Index, any Index, Exponential Theorem, Logarithm Theorem **Complex Number:** Definition of Complex Number**,** Operations on Complex Number (Add., Sub ,Multiplication, Division)**,** Conjugate Complex Number**,** Modulus and Amplitude of a Complex Number, Polar form of a Complex Number	8
Unit – IV	**Two Dimensional Coordinate Geometry:** General Introduction**,** Distance Formula and Ratio Formula ,Co-ordinate of Centroid, In-Centre, Ortho-Centre and Ex-Centre of a Triangle, Area of Triangle, Straight Line, Slope form, Intercept form, Perpendicular form, One Point Slope form, Two Point form & General form, Angle between Two Lines Perpendicular Distance of a Line from a Point	7
Unit-V	**Conic: Circle :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(simple problems) **Parabola :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(Simple problems) **Ellipse and Hyperbola :** Definition and Standard Equations**,** Equations of Tangent and Normal at a Point(simple problems)	8
	Text Books: 1. Mathematics XI & XII NCERT, New Delhi 2. Mathematics XI & XII Rajasthan Board, Ajmer(Hindi) 3. Polytechnic Mathematics H. K. Dass 4. Text Book on Differential Calculus Chandrika Prasad **Reference Books:** 1:Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition. 2:Higher Engineering Mathematics, B.V.Ramana, Tata McGraw Hill. 3: Thomas Calculus, Maurice D. Weir, Joel Hass and others, Pearson, 11th Edition.	

1D05: Computer Fundamental & Information Technology

Objective: Computer programming (often shortened to programming or coding) is the process of designing, writing, testing, debugging, and maintaining the source code of computer programs. This source code is written in one or more programming languages.

Unit	Topic	40 Hours
Unit – I	**Introduction:** Computer: An Introduction**,** Generation of Computers &Types : PC, PC/XT, PC/AT, Main Frame, Super, LapTop, Pam Top**,** Central Processing Unit (CPU) Memory Unit, Input/ Out Devices : Keyboard, Mouse (Optical), Digitizer, Scanner, Web Camera, Monitor (CRT, TFT) , Printers, Plotters, Bar Code Reader, Secondary Storage Devices : Floppy, Hard Disk, CD, DVD, Flash, Drive, Block Diagram Showing	**8**

	Interconnection of Computer Parts, **Data Representation:** Bit, Nibble, Byte, Word**,Number System** : Decimal, Binary, Hexadecimal & their Conversions, Arithmetic Operations (Addition, Subtraction using Binary Number System) 1s , 2s Compliment, Coding Technique : BCD, EBCDIC, ASCII ,Idea of: Hardware ,Software, Firmware, Free ware, Human ware, Computer Languages and Translators Machine, Assembly, High Level Language, Scripting Language, Object Oriented Language, Platform Independent Language, Translators: Assembler, Interpreter, Compiler	
Unit – II	**Operating System :** Definition of Operating System (OS)**,** Types of OS**,** Single user, Multi user**,** Multi Programming**,** Time Sharing**,** Multi Processing, **Introduction to Windows XP:** Introduction to Windows Environment**,** Parts of Windows Screen**,** Icon, Menu, Start Menu**,** Minimizing , Maximizing , Closing Windows**,** Windows Explorer, Recycle Bin, Clipboard, My Computer, MyNetwork PlacesControl Panel : Adding New Hardware and Software, Display,Font, Multimedia, Mouse, International SystemAccessories: Paint, Media Player, Scan disk, System Information.	**8**
Unit – III	**Information Concepts and Processing:** Definition of Data, Information**,** Need of Information**,** Quality of Information**,** Concepts of Data Security, Privacy, Protection**,** Computer Virus and their types**,** Scanning & Removing Virus **Computer and Communication:** Need of Data Transmission**,** Data Transmission Media**,** Baud rate and Bandwidth, Digital and Analog TransmissionSerial and Parallel Data Transfer, Protocols, MODEM. Networking of Computers : LAN, WAN, MAN, Blue tooth 6.6 LAN Topologies: Bus, Star, Ring, HybridIntroduction to Ports : RS232, IEEE 488, PS2, USB, UTP	**8**
Unit – IV	**Information Processing:** Word processor**,** Introduction to MS-Word**,** Starting MS-Word Special Features of MS-Word**,** Using Help**,** Opening Document, Typing and Editing**,** Copying, Inserting, Moving, Deleting**,** Copying from One Document to Others , Undo, Redo, Spell Check, Find and Replace**,** Formatting**,** Characters and Fonts **,**Spacing Removing Characters Formatting**,** Inserting Symbols**,** Paragraphs, Page Setting**,** Header and Footer**,** Page Breaks**,** Borders and Shading**,** Print Preview and Printing**,** Tables and Columns**,** Mail Merge**.** Auto Text and Auto correct**,** Introduction to Macro**,** Electronic Spread Sheet**,** Introduction to MS-Excel**,** Working with Spread Sheet**,** Editing the Worksheet**,** Worksheet Formatting**,** Formula Entering**,** Function Wizard**,** Saving and Printing Work Book**,** Analysis Tools **Data Tools** Charts Linking Work Sheets**,** Report Wizard**,** Data Base Application**,** Data Base Components**,** Working with Database**,** Creating Excel Database**,** Adding Records using Data Form**,** Deleting Records using Menu Command**,** Deleting Records using Data Form**,** Editing Records**,** Finding Records based on Criteria	**8**
Unit – V	**Internet:** Introduction to Internet**,** Bridges, Routers, Switch, Gate way**,** www, Web Site, URL**,** e-mail, e-Commerce**,** Web browsing, Web page**,** Introduction to Hyper text& HTML**,** Introduction to http & ftp Protocol. **Power Point:** Introduction to Power Point**,** Creating a Presentation/Slide**,** Adding Animation in Slide**,** Running a Slide Show	**8**
	Suggested Text Books: 1. Computer Fundamental V.K. Jain, Standard Pub.& Distributors 2. PC Software for Windows made simple R.K. Taxali, TMH 3. Mastering Windows XP TMH 4. BPB Computer Course BPB Editorial Board, 5.**1.** Computer Fundamental V.K. Jain, (hindi Edition) **Suggested Reference Books:** 1. Introduction to Networking NANCE, PHI 2. First Course in Computer Science Sanjeev Saxena, Vikas Publishing House First Look Microsoft Office 2003 Murray, Phi 3.Web Based Application Development Ivan Beyross, TMHusing HTML, DHTML, Java script Pearl/ CGI	

1D06: Applied Chemistry Lab-I

Objective: Develop the ability of students to carry out experiments, collect and interpret data, and critically report results through "hands-on" laboratory experiences.

	List of Experiments	
	1. Identification of Acid and Basic Radicals in a Salt (Total Numbers = 5) 2. Analysis of a Mixture Containing Two Salts (Not Containing Interfacing Radicals). (Total Numbers = 5) 3. Determination of Percentage Purity of an Acid by Titration With Standard Acid. 4. Determination of Percentage Purity of a Base by Titration With Standard Alkali Solution. 5. Determination of the Strength of Ferrous Sulphate using Standard Ferrous Ammonium Sulphate and Potassium Dichromate as Intermediate Solution 6. Determination of the Strength of Farrous Sulfate Solution using Standard 7.Solution of Thiosulphate.To determine the strength of NaOH and Na_2CO_3 in a given alkali mixture 8.Estimation of percentage of iron in plain carbon steel. 9.To find the eutectic point for a two component system by using method of cooling curve. 10.Determine the reaction rate constant for the Ist order reaction	

Text Books:

1.Engineering Chemistry ,Mathur and Aggarwal

2. A text Book of Engineering Chemistry , S.K. Jain & K.D. Gupta

Reference Books:

1.Practical Chemistry For Engineers , Dr. Renu Gupta & Dr. Sapna Dubey

1D07: Applied Physics Lab-I

Objective: : An experiment or test can be carried out using the scientific method to answer a question or investigate a problem. he results are analyzed, a conclusion is drawn, sometimes a theory is formed, and results are communicated through research papers.

	List of Experiments	
	1. To Measure Internal Dia, External Dia and Depth of a Calorimeter using Vernier Callipers. 2. To Measure Density of a Wire using Screwgauge 3. To Measure Radius of Curvature of a Lens, Mirror using Spherometer. 4. To Determine Refractive Index of Glass using Prism. 5. To Determine the Refractive Index of Glass using Travelling Microscope 6. To Determine Focal Length of a Convex Lens by Displacement Method. 7. To Determine the Velocity of Sound at O0c using Resonance Tube. 8. To Determine Young's Modulus of Elasticity using Searle's Apparatus.9. To Determine Acceleration due to Gravity using simple pendulum. 10. To verify Newton's law of cooling.	
	Text Book: 1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH) 2. Practical Physics – S.L.Gupta&V.Kumar (PragatiPrakashan). **Reference Books:** 1.. Advanced Practical Physics Vol.I& II – Chauhan& Singh (PragatiPrakashan)	

1D08: Computer Fundamental & IT Lab- I

Objective: The choice of language used is subject to many considerations, such as company policy, suitability to task, availability of third-party packages, or individual preference. Ideally, the programming language best suited for the task at hand will be selected.

	List of Experiments	
	1. Study of Computer Components 2. Practice of Computer Booting Process in XP 3. Demonstration of Windows Environment 4. Practice of using My Computer, Windows Explorer 5. Practice of using Control Panel 6. Practice of My Network Places 7. Practice of CD and DVD Writing	

	8. Practice of Paint 9. Installation of Windows XP by using NTFS File System. 10. Demonstration of Network	
	Suggested Text Books: 1. Yadav DS, Foundations of IT, New Age, Delhi. 2. Curtin, Information Technology: Breaking News, Tata Mo Grew Hill. **Suggested Reference Books:** 1. Nelson, Data Compression, BPB.	

1D09: Engineering Drawing

Objective: In order to produce a good product, a neat drawing is a must. Therefore students must be well acquainted with the knowledge of Engineering drawing. Engineering drawing is the universal language of engineers and student must be made familiar with all the relevant aspect topics of machine drawing.

	List of Experiments	
	1. Preparation of following on Imperial Size Drawing Sheet :- 1.1 Lines, Letters and Scales 1.2 Geometrical Constructions and Engineering Curves. 1.3 Projection of Lines 1.4 Projection of Planes 1.5 Projection of Solids 1.6 Orthographic Projections of Simple objects 1.7 Section and Development of Surfaces of Solids i.e. Cone, Cylinder, Sphere etc. 1.8 Section and Development of Surfaces of Prism and Pyramids 1.9 Isometric Projections	

	1.10 Riveted Joints. 1.11 Screw Threads and Fasteners 1.12 Pulleys 1.13 Couplings 1.14 Bearing 1.15 Building Drawing **2. Preparation of following Drawings in Sketch Book (Home Assignment)** 2.1 Lettering (On Graph Sheet) 2.2 Projection of Points In Different Quadrants 2.3 Isometric Projection of Various Planes 2.4 Various Types of Rivet Heads 2.5 Section and Conventions 2.6 Set Screws 2.7 Machine Screws 2.8 Foundation Bolts, Keys	
	Text Books: 1. Engineering Drawing N D Bhatt 2. Machine Drawing N D Bhatt 3. Engineering Graphics V. Laxmi Narayan 4. Machine Drawing V. Laxmi Narayan 5. Engineering Drawing P S Gill 6. Machine Drawing M L Mathur **Reference Books:** 1. A Text Book of Machine Drawing Laxmi Narayana and Mathur, M/s. Jain Brothers, New Delhi.	

2D10: Workshop Practice – I		
Objective: This subject is designed to give basic knowledge of carpentry shop , fitting shop , welding shop & sheet metal shop with practical exposer		
	List of Experiments	
	Carpentry Shop 1. Preparation of Cross-Half Lap Joint. 2. Preparation of Dovetail Joint 3. Preparation of Bridle Joint 4. Preparation of Mortise and Tenon Joint 5. Preparation of Mitre Joint 6. Demonstration of Job on Wooden Polishing Work **Welding** 7. Preparation of a Butt Joint by Gas Welding. 8. Preparation of Lap Joint by Electric arc Welding. 9. Preparation of T-Joint by Electric arc Welding. 10. Demonstration on Brazing by the Instructor. 11. Demonstration on Soldering. 12. Demonstration on Gas Cutting.	
Suggested Text Books : 1. Workshop Technology Gupta &Malani 2. Workshop Technology Kumar & Mittal 3. Workshop Technology Hajra, Chaudhary **Suggested Reference Books:** **1** Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.		

Semester-II

2D01: Applied Chemistry-II **(Cr, L:T:P:-3,3:1:0)**

Objective: The reactions & synthesis procedures of materials like water analysis, chemical kinetics, corrosion and basic chemistry (IUPAC) behind them will makes interesting the topic & improve the research ability with their wide ideas.

Unit	Topic	40Hours
Unit – I	**Fuels:** Definition, Classification, Calorific Value (HCV and LCV) and Numerical Problems on Calorific Value, Combustion of Fuels, Numerical Problems on Combustion **Solid Fuels:** Coal and Coke **Liquid Fuels:** Petroleum and its DistillationCracking, Octane and Cetane Values of Liquid Fuels Synthetic Petrol, Power AlcoholBio-Gas, Nuclear Fuels – Introduction to Fission and Fusion Reactions.	**8**
Unit – II	**Corrosion:** Definition **Theories ff Corrosion:** Acid Theory (Rusting) **,** Direct Chemical Corrosion or Dry Corrosion**,** Wet Corrosion or Electro-Chemical Corrosion(Galvanic and Concentration Cell Corrosion)Various Methods for Protection from Corrosion	**8**
Unit – III	**Polymers:** Definition **Plastics:** Classification, Constituents**,** Preparation, Properties and Uses of Polythene, BakeliteTerylene and Nylon. **Rubber:** Natural Rubber, Vulcanisalion **,**Synthetic Rubbers - Buna - N, Buna-S, Butyl and Neoprene	**8**
Unit – IV	**Cement and Glass:** Manufacturing of Portland Cement**,** Chemistry of Setting and Hardening of Cement**,** Glass : Preparation, Varieties and Uses. **Lubricants:** Definition, ClassificationProperties of Lubricants : Viscosity, Oiliness, Flash Point, FirePoint, Acid Value, Saponificatin, Emulsification, Cloud and Pour Point.,Artificial Lubricants	**8**
Unit-V	**Miscellaneous Materials:** Refractories : Definition, Classification and Properties Abrasives : Natural and Synthetic Abrasives**,** Paint and Varnish : Definition and Function of Constituents**,** Soap and Detergents : Definition, Properties and Uses**15. _ew** **Engineering Materials: (Brief Idea of Following)** Superconductors, Organic Electronic Materials Fullerences Optical Fibres	**8**

Text Books1. Practical Chemistry for Engineers Virendra Singh (Hindi)
2. Hand book of Technical Analysis Bannerji Jain Bros.Jodhpur
3. Engineering Chemistry-I(Hindi) Mathur& Agrawal.
4.. Inorganic Chemistry Shivhare&Lavania

Suggested Reference Books:

1. Engineering Chemistry, Jain & Jain, Dhanpat Rai
2. Engineering Chemistry, M.M. Uppal

2D02:Applied Physics-II

Objective:physics is combined with problem solving and engineering skills, which then has broad applications. Career paths for Engineering physics is usually (broadly) "engineering, applied science or applied physics through research, teaching or entrepreneurial engineering".

Unit	Topics	38 Hours
Unit – I	**A.C. Circuits:** Faraday's Laws of Electro Magnetic Induction, Lenz's Law Self and Mutual Inductance Alternating Current, Phase & Phase Difference**,** Instantaneous, Average and rms value of AC, Behaviour of Resistance, Capacitance and Inductance in an AC Circuit, AC Circuits Containing, R-L, R-C and LCR in Series ,Power in AC Circuit and Power Factor,Choke Coil	**8**
Unit – II	**Semi Conductor Physics:** Energy Bands in Conductor, Semi Conductor& Insulator**,** Chemical Bonds in Semiconductor**,** Intrinsic and Extrinsic Semiconductors**,**PN-Junction Diode, Working, Biasing and Characteristics Curves**,**Zener Diode and Voltage Regulation	**10**

	using it, Half Wave & Full Wave Rectifiers (only working, noderivations),Junction Transistors, Working, Biasing and Characteristic Curves, Brief Idea of Using Transistors as an Amplifier (without mathematical analysis)	
Unit – III	**Modern Physics:** Photo Electric Effect, Einstein's Equation, Photo Cells, **Lasers:** Stimulated Emission and Population Inversion, Types of Laser - Helium Neon and Ruby Laser, Application of Lasers (brief idea only),Material Processing, Lasers in Communication Medical Applications	**8**
Unit – IV	**Nuclear Physics:** Idea of Nuclear Force, Mass - Defect and Binding Energy, Nuclear Reactions, Natural and Artificial Radioactivity , Law of Radioactive Disintegration Half Life & Mean Life, Idea of Nuclear Fission and Fusion. Chain Reaction,Nuclear Reactor	**8**
Unit -V	**Pollution and its control:** Introduction to Pollution – Water, Air, Soil , Noise, Nuclear and mental pollution, Types of Pollution , Brief idea about Noise Pollution and its Control, Nuclear Hazards, Nuclear Waste Management	**4**

Suggested Text :

1.A Text Book of Applied Physics N.S. Kumar (Hindi)

2.Principles of Physics Brijlal, Subhramanyam

3.Applied Physics Vol.-II Hari Harlal, NITTTR

Reference Books:

1. A Text Book of Applied Physics N.S. Kumar
2. Principles of Physics Brijlal, Subhramanyam

2D03: Applied Mathematics-II

Objective: Engineering mathematics is a branch of mathematics that concerns itself with mathematical methods that are typically used in science, engineering, business, and industry. Thus, "applied mathematics" is a mathematical science with specialized knowledge.

Unit	Topics	40 Hours
Unit – I	**Limits:** Concept of Limit, L.H.L., R.H.L., Limit of Standard Functions , Concept of Continuity and Differentiability at a Point (simple Problems) **Function:** Definition of Function, Range and Domain of Function, Types of Function, Absolute Value Function, Exponential value Function, Identity Function, Reciprocal Function, Rational and Irrational Function, Increasing and decreasing Function	**8**
Unit – II	**Differential Calculus :**Standard Formulae (Except Hyperbolic Function), Derivative of Sum, difference, Multiplication andDivision of two Functions, Differentiation of Function of a Function, Logarithmic Differentiation, Differentiation of Implicit Functions, Differentiation of Parametric Functions, Differentiation by Trigonometric Transformations, Differentiation of a Function w.r.t. Another Function, Second Order Derivative **Applications of Differential Calculus:** Geometrical meaning of dy / dx . Tangents and Normals , Angle of Intersection between two Curves, Derivative as a Rate Measurer, Errors and Approximations, Maxima and Minima of Function with one Variable	**10**
Unit – III	**Integral Calculus:** General Introduction of Integral Calculus, Integration of Sum and difference of Functions, Integration by Simplification, Integration by Substitution Integration by Parts, Integration of Rational and Irrational Functions, Additional standard **C**formulae, Integration of Trigonometric Functions, Definite Integral and its Properties.	**10**
Unit – IV	C**OORDINATE GEOMETRY Straight Lines: Differential Equations:** Definition of differential Equation. Order, Degree and Solutionof a differential Equation. Solution of a differential Equation of First Order and FirstDegree using, Variable Separable Method, Homogenous Form, Reducible to Homogenous Form, Linear differential Equation Bernoulli's Equation, Exact differential Equation, Substitution Method, Solution of Linear Differential Equation of Higher order withConstant Coefficients Applications of Differential Equations to L-R, L-C, L-C-R ,Circuits of Standard Forms	**8**
Unit-V	**Vector Algebra:** Definition, Addition and Subtraction of Vectors Scalar and Vector Product of two VectorsScalar Triple Product and Vector Triple Product , Applications of	**4**

	Vectors in Engineering Problems **Numerical Integration :** Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Newton - Raphson Rule	

Suggested Text

1. Text Book on Differential Calculus Chandrika Prasad (Hindi)
2. Text Book on Integral Calculus Chandrika Prasad
3. Differential Calculus M. Ray, S. S. Seth, & G. C. Sharma
4. Integral Calculus M. Ray, S. S. Seth, & G. C. Sharma

Reference Books:

1.Integral Calculus, M.Ray, S.S.Seth&G.C.sharma.
2.Vector Calculus, R.Kumar.

2D04:Electrical & Electronics Technology

Objective: At the end of the course the student will be able to gauge various fundamentals aspects of Basic Electrical and Electronics engineering covering networks theory, single and three phase circuits, transformers and dc machines. Also it will impart knowledge about transistors and thyristor.

Unit	Topic	36 Hours
Unit – I	**DC Networks :**Resistance, inductance, capacitance, current, voltage, power, Ohms law**,** Kirchhoff's Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.	**10**
Unit – II	**Single Phase AC Circuits :**Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series- Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor. **Three Phase A.C. Circuits :** Generation of Three-Phase AC Voltage, Delta and Star-Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Measurement of Power in Three Phase Balanced Circuits.	**10**
Unit – III	**Transformer :**Faraday's Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current Relationship and Phasor Diagram of Ideal Transformer.	**8**
Unit – IV	**Transistor:** Bipolar Junction Transistor, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers. **Thyristors:** Diode and VI characteristic,four layer diode, Bi-directional thyristors.	**8**

Suggested Text /:

1. Sahdev – Basic Electrical and ElectonicsEngg.

J.B.Gupta – Basic Electrical and Electronics Engg.(Hindi)

2.
3. B.L. Thareja- Electrical Technology-Vol I

Reference Readings

1.H.P. Tiwari – Electrical and Electronics Engg.
2. Basic Electrical and ElectonicsEngg, Tata Mcgraw Hill

2D05:Applied Mechanics

Objective: This subject is design to give the basic knowledge of equilibrium of forces, center of gravity, centroid, moment of inertia and concept and application of work power energy**.**

Unit	TopicS	40 Hours
Unit – I	**Force:** Definition**,** Units**,** Different Types of Forces. **Coplanar Forces:** Resolution of Forces**,** Law of Parallelogram of Forces**,** Resultant of two or more Forces**,** Basic Conditions of Equilibrium**,** Lami's Theorem (No Proof)**,** Jib Crane**,** Law of Polygon of Forces (Only Statement)**Moment:** Definition, Units & Sign Convention., Principle of Moments, Application of Equilibrium Conditions for non-concurrent Forces	**8**
Unit – II	**Application of Principles of Forces & Moments:** Levers & their Types.**,** Reactions of Simply Supported Beams (Graphical &Analytical Method)**,** Steel Yard .**,**Lever Safety Valve Foundry Crane **Centre of Gravity:** Concept**,** Centroid**,** Calculation of C.G. of Regular Bodies**,** Calculation of C.G. of Plain Geometrical Figures	**10**

	Friction: Types of Friction**,** Laws of Friction**,** Angle of Friction**,** Angle of Repose**,** Friction on Horizontal and Inclined Plains**,** Application of.	
Unit – III	**Simple Machines:** Basic Concepts**,** Loss in Friction**,** Inclined Plane**,** Simple & Differential Wheel and Axle(Neglecting Rope thickness)Screw JackLifting CrabsSystems of Pulleys**,** Worm and Worm Wheel **Rectilinear Motion:** Concept**,** Motion under Constant Velocity**,** Motion under Constant Acceleration**,** Velocity-time graph and its uses **Motion under Gravity:** Concept**,** Vertical Motion**,** Smooth Inclined Plane **Projectiles:** Concept	**10**
Unit – IV	**Simple Machines:** Basic Concepts**,** Loss in Friction**,** Inclined Plane**,** Simple & Differential Wheel and Axle(Neglecting Rope thickness)**,** Screw Jack**,** Lifting Crabs Systems of Pulleys, Worm and Worm Wheel **Rectilinear Motion:** Concept**,** Motion under Constant Velocity**,** Motion under Constant Acceleration**,** Velocity-time graph and its uses	**8**
Unit-V	**Motion under Gravity:** Concept**,** Vertical Motion**,** Smooth Inclined Plane **Projectiles:** Concept, Range, Maximum Height and Time of Flight, Equation of Trajectory Calculation of Velocity of Projectile at Certain Height, And at Certain instant **Newton's Laws of Motion:** Definitions**,** Momentum and it's Unit**,**Application of Second Law of Motion	**4**

Suggested Text Books

1. Engineering Mechanics by, RK Rajpoot(Hindi)
2. Engineering Mechanics by, RS Khurmi
3. Engineering Mechanics ByChitranjan Aggarwal

Suggested Reference Books

1. **Engineering Mechanics by Nelson , Tata Mcgraw Hill**
2. **Engineering Mechanics by Shailesh Kumar**

2D06:Applied Chemistry Lab-II

Objective: Develop the ability of students to carry out experiments, collect and interpret data, and critically report results through "hands-on" laboratory experiences.

	List of Experiments	
	1. Determination of the Strength of Copper Sulphate Solution using a Standard Solution of thioSulphate. 2. Determination of pH Values of Given Samples. 3.Determination of Hardness of Water by EDTA Method. 4. Estimation of Free Chlorine in Water. 5.Determination of Acid Value of an Oil. 6. Preparation of Soap. 7.To determine the Viscosity & Viscosity Index of a given lubricating oil by Redwood Viscometer No. 1	

Text Books:

1.Engineering Chemistry ,Mathur and Aggarwal

2. A text Book of Engineering Chemistry , S.K. Jain & K.D. Gupta

Reference Books:

1.Practical Chemistry For Engineers , Dr. Renu Gupta & Dr. Sapna Dubey

2D07: Applied Physics Lab-II

Objective: This lab is to help the student to understand the concept of Diode, PN junctions, Half deflection method and the concept of cells **.**

	List of Experiments	
	1. To Determine Acceleration due to Gravity using Simple Pendulum. 2. To Verify Newton's Law of Cooling. 3.. To Verify Law of Resistances. 4. To Determine Specific Resistance of Material using Meter Bridge. 5. To Determine Internal Resistance of a Primary Cell using Potentiometer. 6. To Compare emf of two Primary Cells using a Potentiometer. 7. To Draw Characteristic Curves of PN Diode and Determine its Static and Dynamic Resistance. 8. To Draw Characteristic Curves of a PNP/NPN Transistor in CB/CE	

	Configuration. 9.. To Measure Resistance of a Galvanometer by Half-Deflection Metho	

Text Book:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta&V.Kumar (PragatiPrakashan).

Reference Books:
1.. Advanced Practical Physics Vol.I& II – Chauhan& Singh (PragatiPrakashan)

2D08: Electrical & Electronics Workshop

Objective:this lab will help the students learn about key and basic electrical devices and apparatus used in day-to-day life. Also this will be useful in gaining knowledge about house hold electrical circuits.

	List of Experiments	
	1. Study of Symbol, Specification and Approximate Cost of Common Electrical Accessories, Tools and Wires & CablesRequired for Domestic Installation. Study of : 2.1 Basic Electricity Rules for a Domestic Consumer 2.2 Safety Precautions & use of Fire Fighting Equipments 3. Use of series of Phase Tester, Series Test Lamp, Tong Tester and Megger in Testing of Electrical Installation. 4. 4.1 Prepare a Potential Divider and Measure Resistance of a Filament Lamp Using Voltmeter and Ammeter. 4.2 Measurement of Power and Energy Consumption by an Electric Heater using Watt Meter and Energy Meter. 5. Preparation of Wiring Diagram, Wiring, Testing, Fault Finding & Costing for : 5.1 Control of one Lamp by one Switch (using Batten and Tumbler Switch) 5.2 Control of Stair Case Wiring (using Casing Capping, CFL and Flush Type Switches) 5.3 Control of one Bell Buzzer and Indicator by one Switch (using Conduit and Flush type Switch) 6. Prepare one Switch Board as per Institutional Requirement (using Flush type Switches, Sockets, MCB, ELCB, Etc.) 7. Study, Connecting, Testing and Fault Finding of 7.1 Fluorescent Tube and its Accessories 7.2 Ceiling Fan with resistance type and Electronic Regulator 8. Study, Functioning, Fault Finding & Repairing of following Domestic Appliances - 8.1 Automatic Electric Iron 8.2 Air Cooler 8.3 Electric Water Pump 9. Design, Draw and Estimate the Material required for Installation For a small Residential Building/ Office/ Hall. **Identification of following Resistors and finding their Values:** 1.1 Carbon and Metal Film 1.2 Variable Resistance Log and Linear 1.3 Semi Variable Preset of One Turn &Multiturn **2. Identification of following Capacitor and finding their Values:** 2.1 Mica 2.2 Ceramic 2.3 Polysterene 2.4 Electrolytic 2.5 Tantalum **3. Identification of following Switches and Study of their Working Mechanism:** 3.1 Toggel 3.2 Bandswiteh 3.3 Rotary 3.4 Push to on and off 3.5 Press to on and off **4. Identification and Testing of following type of Connectors:** 4.1 Rack and Panel 4.2 Printed Circuit Edge	

	4.3 Coaxial 4.4 Tape & Ribbon 4.5 Plate **5. Study of Different Relays and their Contacts.** **6. Study of following Tools used in Electronic Workshop:** 6.1 Component Lead Cutter 6.2 Wire Strippers 6.3 Soldering Iron & Soldering Station 6.4 De-Solder Pump **7. Measurement of Voltage, Current and Resistance using Analog & Digital Millimeter.** **8. Testing of Electronic, Component such as Capacitor, Inductor, Diode and Transistor.** **9. Measurement of Amplitude & Frequency of a Signal using CRO.** **10. Verification of Ohm's law using Resistive Circuit and Analog Meters.** **11. Soldering of different passive component combination on general purpose PCB.** **12. Sketching of different Electronic Components Symbol on Drawing**	

Text Books :

Electrical Workshop M.L. Gupta

2. Domestic Devices & Appliances K.B. Bhatia

3. Electrical Workshop S.L. Uppal

4. Electrical Component & Shop Practice K.R. Nahar

5. Maintenance of Electrical Equipments K. S. Janwal

6. Hand Book of Philips Component

Reference Books:

1.Electrical Components and Shop Practice ,K.R. Nahar

2D09: Workshop Practice -II

Objective: This Lab is design to give practical exposure of engineering workshop in different shop like smithy shop, machine shop, foundry shop, and student should be able to understand different types of tool, material and measuring instrument and their application.

	List of Experiments	
	Sheet Metal Shop: Preparation of following utility Jobs Involving Various Sheet MetalJoints (Single and Double Hem Joints, Wired Edge, Lap Joint Grooved Seam Joint, Single and Double Seam Joint) and Exercises (Soldering and Riveting Joints) 1 Preparation of a Soap Tray &Mug 2. Preparation of Funnel **Fitting and Plumbing Shop** 1. Marking Filing & Hack Sawing Practice. 2. Production of Utility Job involving Marking, Filling and Hack Sawing. 3. Production of Utility Job involving Marking, FillingandHack Sawing Drilling and Tapping. 4. Cutting and Threading on G.I. Pipe 5. Exercise on PVC Pipe Fitting. 6. Repair of Taps and Cocks.	

Suggested Text Books :

1 Workshop Technology B.S. Raghhuwanshi

2. Workshop Technology (Hindi) TahilMaghnani

3. Workshop Technology (Hindi) Vinay Kumar

4. Domestic Devices and Appliances K.B. Bhatia

Suggested Reference Books:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers

2D10 : Computer Fundamental & IT Lab-II

Objective: This lab is designed so that the better presentations and documents could be made by the students. It comprises the M.S. Excel, M.S. and powerpoint presentations.

	List of Experiments	
	1. Visit to Internet Site 2. Creating e-mail Account , Sending and Receiving e-mails. 3. Sending e-mail with Attachment & Signature 4. Searching Web Page/ Site using Search Engine (eg. google.com, yahoo.com, altavista.com etc.) 5. Exercise Based on MS-Word: 5.1 Document Preparation 5.2 Printing Document 5.3 Mail Merge usage 5.4 Draw Table 6. Exercise Based on Ms-Excel : 6.1 Work Book Preparation 6.2 Printing Workbook 6.3 Data-base usage 6.4 Draw Charts 7. Exercise Based on Power Point : 7.1 Creating Slide 7.2 Adding, Animations in Slide 7.3 Running Slide 8. Creating Simple Web Page using HTML.	

Suggested Text Books:

1. Yadav DS, Foundations of IT, New Age, Delhi.
2.Curtin, Information Technology: Breaking News, Tata Mo Grew Hill.

Suggested Reference Books:

1.Nelson, Data Compression, BPB.

III SEMESTER

(SESSION 2021-2022 & ONWARDS)

COMPUTER PROGRAMMING

Course Code	:	IT 3001(Same as CB/CI/CS 3001)
Course Title	:	Computer Programming
Number of Credits	:	4 (L: 4; T: 0; P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To enable student, develop structured solutions to problems and implementing them using computers. This involves two parts: i) Formulating a solution for a given problem as a well-defined sequence of actions, and ii) Expressing solution in a machine-readable form or a programming language. For the second part, we will learn the common units of programming languages. The first part can only be learned through the repeated practice of solving problems.

COURSE OUTCOMES

Student should be able to computationally formulate basic problems and write code snippets to execute them. The focus of the course as mentioned above should be on example-based learning. The basic nitty gritties can be skipped, however, the application part should be clear. For instance, when to use an array, when to use loop and when to use conditional statements.

COURSE CONTENTS

The language of choice will be C. The focus will be on problem solving and problem where these ideas can be applied. The main focus of the class will to take examples of problems where these ideas can be employed.

1. **Introduction to Problem Solving**
   - Computational way of thinking
   - Variables
   - Representation
2. **Operators and Formatting**
   - Introduction to Operators
   - Arithmetic Operators
   - Relational Operators
   - Logical and Bitwise Operators
   - Input, Output, Formatting and File I/O
3. **Control Statements**
   - Conditional Statements
   - Repeat Statements
   - Loops
   - Nested Loops
4. **Arrays**
   - Arrays and Memory Organization
   - Strings
   - Multidimensional Arrays
   - Functions and Parameter Passing
5. **Recursion**
   - Introduction to Recursion
   - Recursive solutions

REFERENCE BOOKS:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.
7. Outline of Programming with C, Byron Gottfried, Schaum, McGraw-Hill

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ICT RESOURCES

Course Code	:	IT 3002
Course Title	:	ICT Resources
Number of Credits	:	4 (L: 4; T: 0; P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

The objective of this course is to introduce the concept of PC hardware and its utilities. Students are able to understand network concepts and networking administration in detailed. The ICT applications are very popular these days specially is E-governance, computer-based learning & EMIS.

COURSE OUTCOMES

Student should be able to install windows operating system. The focus of the course as mentioned above should be on example-based learning. The student must be familiar with working on tools such as compression utilities, file recovery and antivirus. Students must be able to use networking, networking devices and network administration to achieve desired communication.

COURSE CONTENTS

1. **PC Assembly & Operation**
   - Assembly & Disassembly of PC & its various parts
   - Booting and BIOS Setup
   - CMOS Setup & meaning of its various setting
2. **Configuration of PC**
   - Installation of Windows OS
   - Installation of S/W packages such as MS office etc.
   - Operation of printers & installation of printer driver
   - Backup & Restore operation
3. **Utilities**
   - Concept of Compression
   - Compression Utilities: winzip, pkzip, winrar
   - Defragmenting hard disk using defrag
   - Scandisk for checking disk spaces
   - Lost files & recovery
   - Formatting Hard disk
   - Antivirus packages
   - CD Writing Software, Nero etc.
4. **Networking Concepts**
   - Introduction
   - LAN, WAN, MAN
   - Network Topologies
   - Transmission media & method of communication
   - Cabling: Straight through cross over
   - Study of components: switches, bridges, routers, WI FI routers etc.
   - Communication Protocol, TCP/IP
   - IP Addressing
   - MAC Address
   - Sub netting
5. **Network Administration**
   - Installing & Configuring the Network Windows operating system
   - Creation of user& groups
   - File Sharing
   - Resource sharing

REFERENCE BOOKS:

1. Upgrading & Repairing PC's Scott & Muella, Techmedia, New Delhi
2. Computer Installation and Servicing D. Balasubramanian, TMH
3. Basic of Network NIIT, Prentice, Hall of India
4. Network Protocols & Slandered NIIT, Prentice, Hall of India

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DATA STRUCTURES

Course Code	:	IT 3003(Same as CB/CI/CS 3003)
Course Title	:	Data Structures
Number of Credits	:	2 (L: 2, T: 0, P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To provide strong foundation for implementing programming language to formulate, analyze and develop solutions related to various data structures problems.

COURSE OUTCOMES

Have a good understanding of Data Structures and its applications in algorithms.

COURSE CONTENTS

1. Introduction to Data Structures

Basic Terminology
Classification of Data Structures
Operations on Data Structures.

2. Linear Data Structures

2.1. Stacks
- 2.1.1. Introduction to Stacks
- 2.1.2. Array Representation of Stacks
- 2.1.3. Operations on a Stack
- 2.1.4. Applications of Stacks
  - 2.1.4.1. Infix-to-Postfix Transformation
  - 2.1.4.2. Evaluating Postfix Expressions.

2.2. Queues
- 2.2.1. Introduction to Queues
- 2.2.2. Array Representation of Queues
- 2.2.3. Operations on a Queue
- 2.2.4. Types of Queues
  - 2.2.4.1. DeQueue
  - 2.2.4.2. Circular Queue
- 2.2.5. Applications of Queues-Round Robin Algorithm.

3. Linked Lists

Introduction to Linked List
- Singly Linked List
- Representation in Memory
- Operations on a Single Linked List

Circular Linked Lists
Doubly Linked Lists
Linked List Representation and Operations of Stack
Linked List Representation and Operations of Queue.

4. Non Linear Data Structures

4.1. TREES
- 4.1.1. Basic Terminologies
- 4.1.2. Definition and Concepts of Binary Trees
- 4.1.3. Representations of a Binary Tree using Arrays and Linked Lists
- 4.1.4. Operations on a Binary Tree
  - 4.1.4.1. Insertion
  - 4.1.4.2. Deletion
  - 4.1.4.3. Traversals
- 4.1.5. Types of Binary Trees.

4.2. GRAPHS
- 4.2.1. Graph Terminologies
- 4.2.2. Representation of Graphs
  - 4.2.2.1. Set
  - 4.2.2.2. Linked
  - 4.2.2.3. Matrix

4.2.3. Graph Traversals

REFERENCE BOOKS:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, Samanta Debasis, Prentice Hall ofIndia.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G.A.V. Pai, McGraw- Hill Education, India.

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COMPUTER ARCHITECTURE

Course Code	:	IT 3004
Course Title	:	Computer Architecture
Number of Credits	:	4 (L: 3, T: 1, P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To have a thorough understanding of the basic digital electronics, structure and operation of a digital computer, its architectures and computational designs.

COURSE OUTCOMES

Have a good understanding of functioning of computer system as such and its various sub components. Student will be able to understand computing requirement for a specific purpose, analyze performance bottlenecks of the computing device and choose appropriate computing device for a given use case.

COURSE CONTENTS

1. Data Representation

- Data Types
  - Number System
  - Octal and Hexadecimal Numbers
  - Decimal Representation
  - Alphanumeric Representation
- Complements
  - (r-1)'s complement
  - (r's) complement
  - Subtraction of unsigned numbers
- Fixed Point Representation
  - Integer Representation
  - Arithmetic Addition
  - Arithmetic Subtraction
  - Overflow
  - Decimal Fixed-Point Representation
- Floating Point Representation
- Other Binary Codes
  - Gray Code
  - Other Decimal Codes
  - Self-Complementing
  - weighted code
  - excess-3 code
  - Other Alphanumeric Codes
  - EBCDIC
- Error Detection Codes

2. Register Transfer Microoperations

- Register Transfer Language
- Register Transfer
- Bus and Memory Transfer
- Arithmetic Microoperations
- Logic Microoperations
- Shift Microoperations
- Arithmetic Logic Shift Unit

3. Basic Computer Organization and Design

- Instruction Codes
- Computer Registers
- Computer Instructions
- Timing and Control
- Instruction Cycle
- Memory Reference Instructions
- Input-Output and Interrupt

Design of Basic Computer
Design of Accumulator Logic

4. Programming the Basic Computer

Machine Language
Assembly Language
Assembler
Program Loops
Subroutines
Input-Output Programming

5. Microprogrammed Control

Control Memory
Address Sequencing
Microprograms
Design of Control Unit

6. Central Processing Unit

General Register Organization
Stack Organization
Instruction Formats
Addressing Modes
Data Transfer and Manipulation
Program Control
Reduced Instruction set Computer (RISC)

REFERENCE BOOKS:

1. Computer System Architecture, M. Moris Mano, Pearson/PHI India.
2. Microprocessors Interface, Douglas V.Hall, Tata McGraw-Hill.
3. Computer Organization, Carl Hamacher, Zvonks Vranesic, Safea Zaky, McGraw-Hill
4. Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing, A.K.Ray, K.M. Bhurchandi, Tata McGraw-Hill, New Delhi, India.
5. Computer Organization and Design: A Hardwar/Software Interface (MIPS Edition) by Patterson and Hennessy.

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ALGORITHMS

Course Code	:	IT 3005(Same as CS 3005)
Course Title	:	Algorithms
Number of Credits	:	4(L: 3, T: 1, P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

The objective of this course is to prepare the student with the algorithmic foundations of computing. A sound grasp of algorithms is essential for any computer science engineer. Almost all programming involves algorithms at some level.

COURSE OUTCOMES

The student should be able to design basic algorithms for sorting and searching. The student should be able to understand the basic notions of time and space complexity of algorithms. The student should be able to implement sorting, searching, tree and graph algorithms in a modern computer programming language.

COURSE CONTENTS

1. Fundamentals

Programming Models
Data Abstraction
- Sets
- Multisets
- Stacks
- Queues

Asymptotic and worst-case analysis of algorithms.

2. Sorting

The sorting problem
Bubble sort
Selection sort
Insertion sort
Merge sort
Quicksort.

3. Searching

Symbol Tables
Binary Search Trees
Balanced Search Trees
Hash Tables.

4. Graphs

Definition of a directed and undirected graph
- Paths
- Cycles
- Spanning trees

Directed Acyclic Graphs
Topological Sorting
Minimum Spanning Tree algorithms
- Shortest Path algorithms: Dijkstra's algorithm
- Flow-based algorithms.

5. Strings

String Sort
Tries
Substring Search
Regular Expressions
Elementary Data compression.

REFERENCE BOOKS:

1. Algorithms, Sedgewick and Wayne, Pearson
2. Introduction to Algorithms, Cormen, Leiserson, Rivest and Stein. MIT Press
3. Introduction to Theory of Computation, Sipser Michael, Cengage Learnng.
4. Design & Analysis of Algorithms, Gajendra Sharma, Khanna Publishing House

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COMPUTER PROGRAMMING LAB

Course Code	:	IT 3006(Same as CB/CI/CS 3006)
Course Title	:	Computer Programming Lab
Number of Credits	:	2(L: 0, T: 0, P: 4)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

COURSE OUTCOMES

Student should be able to write code snippets, and then compile, debug and execute them.

COURSE CONTENTS

S. No.	Topics for Practice
1	Familiarization with programming environment (Editor, Compiler, etc.)
2	Programs using I/O statements and various operators
3	Programs using expression evaluation and precedence
4	Programs using decision making statements and branching statements
5	Programs using loop statements
6	Programs to demonstrate applications of n dimensional arrays
7	Programs to demonstrate use of string manipulation functions
8	Programs to demonstrate parameter passing mechanism
9	Programs to demonstrate recursion
10	Programs to demonstrate use of pointers
11	Programs to demonstrate command line arguments
12	Programs to demonstrate dynamic memory allocation
13	Programs to demonstrate file operations

The language of choice will be C. This is a skill course. More you practice, better it will be.

REFERENCE BOOKS:

1. Let Us C, Yashavant Kanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

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ICT RESOURCES LAB

Course Code	:	IT 3007
Course Title	:	ICT Resources Lab
Number of Credits	:	2 (L: 0, T: 0, P: 4)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

This Lab course is intended to practice what is taught in theory class of 'Introduction to ICT Resources' and become proficient. Using ICT Resources proficiently is all about regular practice. Students should work on windows operating system, and use the stated tools.

COURSE OUTCOMES

Student should be able to install Windows OS, and use basic tools and perform networking.

COURSE CONTENTS

S. No.	Topics for Practice
1	Installation of Windows OS
2	Study of Window registry
3	Backup & Restore procedure of Windows.
4	Use of Compression Utilities.
5	Use of CD Writing Software
6	To prepare straight & Cross over cable using standard color coding.
7	Install NIC, assigning of IP address to the system
8	To Create simple LAN with two PC using single cross over cable to connect the workstation.

REFERENCE BOOKS:

1. Upgrading & Repairing PC's Scott & Muella, Techmedia, New Delhi
2. Computer Installation and Servicing D. Balasubramanian, TMH
3. Basic of Network NIIT, Prentice, Hall of India
4. Network Protocols & Slandered NIIT, Prentice, Hall of India

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DATA STRUCTURES LAB

Course Code	:	IT 3008(Same as CB/CI/CS 3008)
Course Title	:	Data Structures Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

This Lab course is intended to practice whatever is taught in theory class of 'Data Structures', 'Algorithms' and is an extension of previous course on 'Computer Programming'. Students should work on problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below. This Lab course requires a good coordination between theory course in Data Structures and Algorithms.

COURSE OUTCOMES

Student will be able to write programs for creating and doing different operations on various data structures. Student will be able to use/implement various algorithms learnt in the course on Algorithms. In summary student will have a good command over Data Structures and its applications in Algorithms.

COURSE CONTENTS

S. No.	Topics for Practice
1	Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique
2	Search operation in a given list of integers using binary search technique
3	Write a program to implement insertion sorting for a given random data
4	Write a program to implement bubble sorting for a given random data
5	Write a program to implement quick sorting for a given random data
6	Write a program to implement selection sorting for a given random data
7	Write a program to implement heap sorting for a given random data
8	Write a program to implement single linked list
9	Write a program to implement double linked list
10	Write a program to implement circular linked list
11	Write a program to Implement Stack operations using array and linked list
12	Write a program to Implement Queue operations using array and linked list.
13	Write a program to implement Breadth First Search (BFS)
14	Write a program to implement Depth First Search (DFS)
15	Write a program to implement a binary tree of integers

Use 'C' as programming language for the purpose. This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Data Structures, R.S. Salaria, Khanna Book Publishing
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, Samanta Debasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G.A.V. Pai, McGraw- Hill Education, India.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

III SEMESTER

(SESSION 2021-2022 & ONWARDS)

OPERATING SYSTEMS

Course Code	:	IT 4001 (Same as CB/CS 4001)
Course Title	:	Operating Systems
Number of Credits	:	3 (L: 3, T: 0, P :0)
Pre-requisites	:	IT 3003 Data Structure
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

A general introduction to various ideas in implementation of operating systems, particularly UNIX. Introduce to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different design choices.

COURSE CONTENT:

UNIT 1:

Overview of Operating System
Basic concepts
UNIX/LINUX Architecture
Kernel
Services and systems calls
System programs.

UNIT 2:

Process management
- Process concepts,
- Operations on processes
- Ipc

Process scheduling:
- FCFS
- SJF
- Priority
- Round Robin

Multi- threaded programming
Memory management
- Memory allocation
- Swapping
- Paging
- Segmentation

Virtual memory

UNIT 3:

File management
- Concept of a file
- Access methods

Directory structure
File system structure and implementation
- Directory implementation
- Free- space management
- Efficiency and performance.

Different types of file systems

UNIT 4:

I/o system
Mass storage structure
- Overview
- Disk structure
- Disk attachment

Disk scheduling algorithms
- FCFS
- SSTF
- SCAN
- LOOK

Swap space management
Raid.

UNIT 5:

OS Security
Authentication
Access Control
Access Rights
System Logs

REFERENCE BOOKS:

1. Operating System Concepts, Silberschatz and Galvin, Wiley India Limited
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education
3. Operating Systems, Internals and Design Principles, Stallings, Pearson Education, India
4. Operating System Concepts, Ekta Walia, Khanna Publishing House
5. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall of India
6. Operating systems, Deitel & Deitel, Pearson Education, India

COURSE OUTCOMES:

Students should be able to demonstrate basic knowledge about Operating System, be able to apply OS concepts such as processes, memory and file systems to system design, able to configure OS in an efficient and secure manner.

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INTRODUCTION TO DBMS

Course Code	:	IT 4002(Same as CI/CS 4002)
Course Title	:	Introduction to DBMS
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	---
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modeling, relational database design and database query languages.

COURSE OUTCOMES:

After completing the course, the students will understand
(i) How to design a database, database-based applications
(ii) How to use a DBMS
(iii) The critical role of database system in designing several information system-based software systems or applications.

COURSE CONTENT:

As a part of the lab, project work is included.

UNIT 1:

Introduction
Components of DBMS
Advantage of DBMS
Database System v/s File System
Database System Concepts and Architecture
Application Architecture of DBMS
Overall Dabatase Structure

UNIT 2 :

Data Modeling using the Entity-Relationship Model
Notations of ER Diagram
Mapping Constraints
Keys
The Enhanced Entity-Relationship (EER) model

UNIT 3:

The Relational Data Model and Relational Database Constraints
Codd's Rule of DBMS
ER/EER to Relational Model map- ping
Relational Algebra
Relational Calculus

UNIT 4:

SQL-99
- Schema definition,
- Constraints
- Queries and Views

Security
Introduction to SQL programming Techniques

UNIT 5:

Functional dependencies and normalization for relational databases
- Normalization Concepts
- Normal Forms (1NF, 2NF, 3NF, BCNF)

Relational database design algorithms and further dependencies.

Multi-Valued Dependancy and 4NF
Join Dependancy and 5NF

REFERENCE BOOKS:

1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, TataMcGraw-Hill.
3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw- Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.Vander Lans, Pearson Education

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COMPUTER NETWORKS

Course Code	:	IT 4003(Same as CB/CI/CS 4003)
Course Title	:	Computer Networks
Number of Credits	:	2 (L: 2, T: 0, P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

Understand functioning of computer networks and popular networking protocols

COURSE OUTCOMES:

1. Understanding of computer networks, issues, limitations, options available.
2. Understanding of the care that needs to be taken while developing applications designed to work over computer networks
3. Able to configure basic LAN and connect computers to it.

COURSE CONTENT:

UNIT 1:

Introduction to computer networks
Network Models
OSI Reference Model
TCP/IP Model

UNIT 2:

Transmission media
- Principles
- Issues and examples

Wired media – coaxial, utp, stp, fiber optic cables
Wireless media – hf, vhf, uhf, microwave, ku band
Network topologies
Data link layer
- Design issues
- Example protocols (ethernet, wlan, bluetooth)
- Switching techniques

UNIT 3:

Network layer
- Design issues
- Example protocols (ipv4)

Routing
- Principles/issues,
- Algorithms (distance-vector, link-state) and protocols (rip, ospf)

UNIT 4:

Transport layer
- Design issues,
- Example protocols (tcp)

Application layer protocols (smtp, dns).

UNIT 5:

Functioning of Network Devices
- NIC, Hub, Switch, Router, WiFi Devices

Network Management System and example protocol (SNMP).

REFERENCE BOOKS:

1. Computer Networks, 4th Edition (or later), Andrew S. Tanenbaum, PHI
2. TCP/IP Illustrated, Volume-1, W. Richard Stevens, Addision Wesley
3. Data and Computer Communications, William Stallings, PHI
4. An Engineering Approach to Computer Networking, S. Keshav, Addision Wesley/Pearson
5. An Integrated Approach to Computer Networks, Bhavneet Sidhu, Khanna Publishing House

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SSAD/SOFTWARE ENGINEERING

Course Code	:	IT 4004(Same as CS 4004)
Course Title	:	SSAD/Software Engineering
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	-
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

1. Inculcate essential technology and software engineering knowledge and skills essential to build a reasonably complex usable and maintainable software iteratively.
2. Emphasize on structured approach to handle software development.
3. Enhance communication skills.

COURSE OUTCOMES:

The proposed course is expected to provide an introduction to software engineering concepts and techniques to undergraduate students, thus enabling them to work in a small team to deliver a soft- ware system. The course content and project will introduce various software technologies, process and project management skills that are needed for the delivery of software in a team setting

COURSE CONTENTS:

As per the course design, concepts learned as part of this course will/should be used in the Minor Project (Proj.202). These two courses should go hand in hand to be effective.

UNIT 1:

Introduction to Software Engineering
Lifecycle
Process Models
Traditional v/s Agile processes

UNIT 2:

Development Activities
Requirements Gathering and Analysis
Design Concepts
Software architecture and Architectural styles
Basic UI design
Effective Coding and Debugging techniques

UNIT 3:

Software Testing Basics,
Unit, Integration, System and Acceptance Testing
Introduction to various testing techniques (e.g. Stress testing)
Writing and executing test cases
Quality Assurance

UNIT 4:

Project Management
Project management concepts,
Configuration and Release Management
Version Control and its tools (Git)
Release Planning
Change Management
Software Maintenance

REFERENCE BOOKS:

1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
2. Software engineering, Ian Sommerville, Pearson Education
3. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag
4. Software Engineering, Nasib Singh Gill, Khanna Book Publishing Co. India.
5. Software Engineering, K. K. Agarval, Yogesh Singh, New Age International Publishers

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C++ PROGRAMMING

Course Code	:	IT 4005
Course Title	:	C++ Programming
Number of Credits	:	2(L: 2, T: 0, P: 0)
Prerequisites	:	IT 3001
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

To provide adequate knowledge about object-oriented programming concept. Today much application software is developed using object-oriented technology. It helps in reusability of the code, sharing of various resources. The user works in real world environment. This paper gives knowledge of object-oriented technology. C++ cover the practical implementation of OOPs. Various features like inheritance, encapsulation etc. are covered.

COURSE OUTCOMES:

After undergoing the subject, students will be able to:

- Explain the concepts of OOPS
- Explain and execute the language construct concepts.
- Debug and compile the program written in C++.
- Explain and implement class program.
- Explain and implement overloading.
- Describe and implement inheritance concepts.

COURSE CONTENT:

1. **An Overview of Object Oriented Programming :**
   The need of object oriented programming
   Characteristics of OOPs: Objects, Classes, Inheritance, Reusability, New data types, Polymorphismand overloading
   Benefits of OOPs
2. **Object Oriented Programming Using C++ :**
   An overview of C++ Programming
   Data Types, Operators, Manipulators
   "cin" and "cout" usages
   Statements : Comments, Assignments, if, switch and loops
   Functions and its default arguments
   Inline functions
3. **Objects and Classes :**
   Class and its members
   Access Specifier : public, private, protected
   Static data member and static functions
   Array of objects
   Constructors and Destructors
   Friend function
   Copy constructor
4. **Overloading of Functions and Operators :**
   Function overloading
   Defining operators over loading
   Rules of overloading operators
   Overloading unary operators
   Overloading binary operators
   Operator overloading using friend functions
5. **Inheritance and Polymorphism :**
   Inheritance: Using public, private and protected access specifiers
   Types of inheritance

Virtual base classes
Virtual and pure virtual functions
Abstract classes

6. Managing Console I/O and File I/O :

C++ streams and stream classes
Unformatted I/O operations
Formatted console I/O operations
Classes for file stream operations
Opening and closing a file
File modes and file pointers

REFERENCE BOOKS:

1. Programming in C++ E. Balaguruswamy, TMH
2. Oriented Programming TURBO C++ Robert Lafore, Galgotia Pub.
3. The Complete Reference C++ Herbert Schildt, TMH
4. The C++ Programming Language B. Stroustrup, Addison wesley/Pearson
5. Let us C++ Y. Kanetkar, BPB
6. Object Oriented Programming and C++ R.Rajaram, New Age

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INFORMATION SECURITY

Course Code	:	IT 40061 (Same as CS 40061)
Course Title	:	Information Security
Number of Credits	:	4 (L: 3, T: 1, P: 0)
Prerequisites	:	--
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To learn how to evaluate and enhance information security of IT infrastructure and organisations

COURSE OUTCOMES:

Understanding of security needs and issues of IT infrastructure. Have basic skills on security audit of networks, operating systems and application software.

COURSE CONTENTS:

UNIT 1:

Introduction to Information Security
Various aspects of information security (PAIN)
Security Features of Operating Systems
- Authentication
- Logs
- Audit Features
- File System Protection,
- User Privileges
- RAID options
- Anti-Virus Software, etc.

UNIT 2:

Understanding security weaknesses in popular networking protocols
- IP
- TCP
- UDP
- RIP
- OSPF
- HTTP
- SMTP etc.

Security weaknesses in common networking devices
- Hub
- Switch
- Router
- Wifi

Security solutions to mitigate security risk of
- Networking protocols (ipsec, HTTPS, etc)
- Devices (VLAN, VPN, Ingress Filtering, etc)

UNIT 3:

Basics of Cryptography
PKI
Security considerations while developing softwares

UNIT 4:

Network Security Products
Firewall
IDS/IPS
VPN Concentrator
Content Screening Gateways, etc.

UNIT 5:

5.1. Introduction to Security Standards
5.2. ISO 27001
Indian IT Act
IPR Laws
Security Audit procedures
Developing Security Policies
Disaster Recovery, Business Continuity Planning

REFERENCE BOOKS:

1. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House
2. RFCs of protocols listed in content (https://www.ietf.org)
3. Various Acts, Laws and Standards (IT Act, ISO27001 Standard, IPR and Copyright Laws, etc.)
4. Security Guideline documents of Operating Systems (OS Manual, Man Pages, etc)
5. https://www.cert-in.org.in/
6. https://www.sans.org/

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CYBER LAWS

Course Code	:	IT 40062 (Same as CI 40062)
Course Title	:	Cyber Laws
Number of Credits	:	4(L: 3, T: 1, P: 0)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To provide an understanding of the basic structure of cyber laws and their impact on every day living in the cyber society. The essential ingredients of a website for the bank. It tells how ISP and cyber café management should work. In view of the social purpose behind the course it is meant to inculcate the knowledge about "Cyber Crimes" and inter alias build some awareness about behavioral aspects that lead to negative behavior in the society.

COURSE OUTCOMES:

Student will have general idea about the cyber contracts, cyber-crimes, cyber privacy, cyber laws and will be able to explore further. To provide an understanding of the basic structure of cyber laws and their impact on every day living in the cyber society. To aware students of the nature of the cyber space, how internet functions, what are the nature of properties created on the internet, how to use digital signatures. Dealing with virus and other cyber-crimes. How banks function in the E-era.

COURSE CONTENT:

UNIT 1:

Information Technology and Legal Response : Introduction
We, Cyberspace and Our Lives
The Nature of the Net
Features of the Net
Geographical Indeterminacy

UNIT 2:

Cyber crimes: Introduction
Cyber Crime – A perspective
The Problem: Current Forms of Computer Crime
Infringements of Privacy
Economic offences
Computer Hacking
Software Piracy and other forms of Product Piracy
Computer Sabotage and Computer Extortion
Computer Fraud
Illegal and harmful contents

UNIT 3:

Cyber contracts: Introduction
Essentials of a contract
Intention to be bound
Offer and Acceptance
Concept of offer
Offer by and to whom
Statements which are not offers
Termination of offer
Quality of acceptance
Consideration
Capacity of the parties
Consent
Unlawful agreements
Persons bound by contract
Performance and frustration
Subsequent Events and Frustration

Remedies for Breach of Contract
Damages
Specific Performance
Injunctions

UNIT 4:

Cyber Privacy: Introduction
Policy approaches to privacy concerns
Market approach
Human rights approach
Contract approach
Platform for Privacy Preferences Project (P3P)

UNIT 5:

Cyber Intellectual Property Rights: Introduction
Concept of Intellectual Property Rights
The Impact of Electronic Commerce on Intellectual Property
The Protection Of Copyright And Related Rights In The Digital Environment
Overview of the Issues
Technological protection measures
Future Work in the protection of Copyright and related rights

UNIT 6:

6.1 Information Technology Act, 2000 (I.T. Act, 2000): Including all the amenDITnts till date
Transmission of electronic documents
Evidentiary presumptions of a secured electronic document
Certifying Authority (CA)
Controller of Certifying Authorities.
Suspension of Certifying Authority
Digital Signature

REFERENCE BOOKS:

1 Cyber Law for Every Netijen in India Na. Vijayashankar
2 Cyber Law Simplified Vivek Sood, TMH

OPERATING SYSTEMS LAB

Course Code	:	IT 4007(Same as CI/CS 4007)
Course Title	:	Operating Systems Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	IT 3003 Data Structures
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice and do experiment on concepts taught in theory class of 'Operating Systems' and gain insight into functioning of the Operating Systems.

COURSE OUTCOMES:

Students should be able to demonstrate basic knowledge about Operating System, be able to apply OS concepts such as processes, memory and file systems to system design, able to configure OS in an efficient and secure manner, and become an advance user of operating system.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Revision practice of various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir.
2	Implement two way process communication using pipes
3	Implement message queue form of IPC
4	Implement shared memory and semaphore form of IPC
5	Simulate the CPU scheduling algorithms - Round Robin, SJF, FCFS, priority
6	Simulate Bankers algorithm for Deadlock Avoidance and Prevention
7	Simulate all FIFO Page Replacement Algorithm using C program
8	Simulate all LRU Page Replacement Algorithms using C program
9	Simulate Paging Technique of Memory Management
10	Practice various commands/utilities such as catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio, mount, umount, find, umask, ulimit, sort, grep, egrep,fgrep cut, paste, join, du, df , ps, who, etc and many more.

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Operating System Concepts, Silberschatz, Abraham and Galvin, Peter, Wiley India Limited
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education
3. Operating System Concepts, Ekta Walia, Khanna Publishing House

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INTRODUCTION TO DBMS LAB

Course Code	:	IT 4008(Same as CI/CS 4008)
Course Title	:	Introduction to DBMS Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	IT 3006 Computer Programming Lab
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice whatever is taught in theory class of 'Introduction to DBMS'. A few sample case studies are listed with some suggested activities. More case studies may be added to this list. You need to develop these case studies, apply all relevant concepts learnt in theory class as the course progress, identify activities/operations that may be performed on the database. It will be a good idea to also use concepts learnt in the course on Software Engineering/SSAD.

COURSE OUTCOMES:

After completing the course, the students will understand
(i) How to design a database, database-based applications
(ii) How to use a DBMS
(iii) The critical role of database system in designing several information system-based software systems or applications.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Case Study-1: Employee database – 'Create' employee table, 'Select' and display an employee matching a given condition, 'Delete' duplicate records, delete rows using triggers, insert and update records, find net salary, etc.
2	Case Study-2: Visitor Management database
3	Case Study-3: Students Academic database
4	Case Study-4: Inventory Management System database
5	Case study-5: Bank Operations database
6	Case Study-6: Bus Operator (Roadways) – Do related activities such as prepare E-R Model, Relational Model, do Normalization, Create Tables, Insert data, Delete Data, Query database, create stored procedures, etc.

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Elmasri & Navathe, Fundamentals of Database Systems, Pearson Education
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill, New Delhi, India.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw- Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.Vander Lans, Pearson Education

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COMPUTER NETWORKS LAB

Course Code	:	IT 4009(Same as CI/CS 4009)
Course Title	:	Computer Networks Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	-----
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice whatever is taught in theory class of 'Computer Networks'. Some of the things that should necessary be covered in lab are listed below:

COURSE OUTCOMES:

1. Understanding of computer networks, issues, limitations, options available.
2. Able to configure basic small LAN and connect computers to it.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Showing various types of networking cables and connectors, identifying them clearly
2	Looking at specifications of cables and connectors of various companies on Internet, find out differences.
3	Making patch cords using different types of cables and connectors - crimping, splicing, etc
4	Demonstration of different type of cable testers, using them for testing patch cords pre- pared by the students in Lab and standard cables prepared by professionals
5	Configuring computing devices (PC, Laptop, Mobile, etc) for network, exploring different options and their impact – IP address, gateway, DNS, security options, etc
6	Showing various networking devices – NICs, Hub, Switch, Router, WiFi access point, etc.
7	Looking at specifications of various networking devices various companies on Internet, find out differences.
8	Setting up a small wired LAN in the Lab
9	Setting up a small wireless LAN in the Lab

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Cisco press books on CCNA
2. User manual of networking devices available in the lab
3. Wiki pages on networking devices

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C++ PROGRAMMING LAB

Course Code	:	IT 4010
Course Title	:	C++ Programming Lab
Number of Credits	:	1(L: 0, T: 0, P: 2)
Prerequisites	:	IT 3006
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

To provide adequate knowledge about object oriented programming concept. Today much application software is developed using object-oriented technology. It helps in reusability of the code, sharing of various resources. The user works in real world environment. This paper give knowledge of object oriented technology. C++ cover the practical implementation of OOPs. Various features like inheritance, encapsulation etc. are covered.

COURSE OUTCOMES:

After undergoing the subject, students will be able to:

- Explain the concepts of OOPS
- Explain and execute the language construct concepts.
- Debug and compile the program written in C++.
- Explain and implement class program.
- Explain and implement overloading.
- Describe and implement inheritance concepts.

COURSE CONTENT:

S.No.	Topics for Practice
1	Practice for Classes and Object Creation
2	Practice for constructors and destructors creation
3	Practice for static and friend functions for a class.
4	Practice for Function overloading
5	Practice for Operator overloading
6	Practice for Copy constructor
7	Practice for inheritance
8	Practice for virtual function
9	Practice for exception handling template
10	Practice for read( ) and write( )

REFERENCE BOOKS:

1. Programming in C++ E. Balaguruswamy, TMH
2. Oriented Programming TURBO C++ Robert Lafore, Galgotia Pub.
3. The Complete Reference C++ Herbert Schildt, TMH
4. The C++ Programming Language B. Stroustrup, Addison wesley/Pearson
5. Let us C++ Y. Kanetkar, BPB
6. Object Oriented Programming and C++ R.Rajaram, New Age

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ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Course Code	IT 4222 (Same in All Branches of Engg.)
Course Title	Essence of Indian Knowledge and Tradition
Number of Credits	0(L-2,T-0, P-0)
Prerequisites	None
Course Category	AU

COURSE CONTENTS:

Basic Structure of Indian Knowledge System:

(i)वेद,
(ii)उनवेद (आयुवेद,धनुवेद,गंधवेद,ÖथानÂयआदद)
(iii)वेदथाथांग (िश³था, कलन, ननिरुत, Öथाकरण,
sयोनतषछथांद), (iv)उनथाइग (धमशथाa र् ीथाथ
ांसथा, नुरथाण, तकशरथाa)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. V. Sivarama Krishna, " Cultural Heritage of India- Course Material", Bhartiya Vidya Bhavan, Mumbai, fifth Edition, 2014.
2. Swami Jitatmanand, " Modern Physics and Vedant", Bhartiya Vidya Bhavan.
3. Fritz of Capra, " The wave of Life".
4. Fritz of Capra, " Tao of Physics".
5. V N Jha, " Tarka sangraha of Annam Bhatta, International" Cinmay Foundation, Velliarnad, Amakuam.
6. R N Jha, " Science of Consciousness Psychotheraphy and Yoga Practices" Vidya nidhi Prakasham, Delhi, 2016.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

V SEMESTER

(SESSION 2021-2022 & ONWARDS)

INTRODUCTION TO E-GOVERNANCE

Course Code	:	IT 5001(Same as CS 50001)
Course Title	:	Introduction to e-Governance
Number of Credits	:	3(L: 2, T: 1, P: 0)
Prerequisites	:	-----
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

To cover the concepts of e-Governance and to understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

COURSE OUTCOMES:

Through exposure to introductory ideas and practices followed in a selected number of e-Governance initiatives in India, the course will help students to understand and appreciate the essence of e-Governance.

COURSE CONTENT:

UNIT 1:

Exposure to emerging trends in ICT for development
Understanding of design and implementation of
e-Government projects,
e-governance lifecycle.

UNIT 2:

Need for Government Process Re-engineering (GPR)
National e-Governance Plan(NeGP) for India
SMART Governments & Thumb Rules

UNIT 3:

Architecture and models of e-Governance, including Public Private Partnership (PPP)
Need for Innovation and Change Management in e-Governance
Critical Success Factors
Major issue including corruption, resistance for change, e-Security and Cyber laws

UNIT 4:

Focusing on Indian initiatives and their impact on citizens;
Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context.
Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

UNIT 5:

Mini Projects by students in groups – primarily evaluation of various e-governance projects

REFERENCE BOOKS:

1. Managing Transformation –Objectives to Outcomes. J Satyanarayana, Prentice Hall India
2. The State, IT and Development. Kenneth Kenniston, RK Bagga and Rohit Raj Mathur, Sage Publications India Pvt Ltd.
3. e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall, India
4. http://www.csi-sigegov.org/publications.php
5. https://negd.gov.in
6. https://www.nisg.org/case-studies-on-e-governance-in-india

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INTERNET OF THINGS

Course Code	:	IT 5002(Same as CI/CS 50002)
Course Title	:	Internet of Things
Number of Credits	:	3(L: 2, T: 1, P: 0)
Prerequisites	:	-----
Course Category	:	PC

COURSE LEARNING OBJECTIVES:

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

COURSE OUTCOMES:

Students will have good understanding of various aspect of IoT, know some tools and have basic implementation skills.

COURSE CONTENTS:

UNIT 1:

Introduction to IoT;
Sensing;
Actuation

UNIT 2 :

Basics of IoT Networking,
Communication Protocols,
Sensor networks

UNIT 3:

Introduction to Arduino programming,
Integration of Sensors/Actuators to Arduino

UNIT 4:

Implementation of IoT with Raspberry Pi;
Data Handling Analytics

UNIT 5:

5.1 Case Studies: Agriculture, Healthcare, Activity Monitoring

REFERENCE BOOKS:

1. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
3. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
4. "Internet of Things: A Hands-on Approach", by ArshdeepBahga and Vijay Madisetti (Universities Press)
5. *Internet of Things: Architecture and Design Principles, Raj Kamal*, McGraw Hill
6. Research papers

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ECONOMIC POLICIES IN INDIA

Course Code	IT 51001 (Same in All Branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approach estotheproblemsofunemployment,poverty,incomegeneration,industrializationfromdifferentperspec-tives
CO4	Abletoidentifytheproblemsandcapabletodecidetheapplicationforfuturedevelopment
CO5	Analyzeeconomicissuesandfindsolutionstocomplexeconomicproblemsandtakecor-recteconomicjudgment

COURSE CONTENTS:

1. BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:

Economic History of India;
Nature of Indian Economy
Demographic features and Human Development Index,
Problems of Poverty, Unemploy-ment, Inflation, income inequality, Blackmoney in India.

2. SECTORAL COMPOSITION OF INDIAN ECONOMY:

Issues in Agriculture sector in India,
land reforms
Green Revolution
agriculture policies of India,

3. INDUSTRIAL DEVELOPMENT,

Small scale and cottage industries,
Industrial Policy,
Public sector in India,
Service sector in India.

4. ECONOMIC POLICIES:

Economic Planning in India,
Planning commission v/s NITI Aayog,
Five Year Plans,
Monetary policy in India,
Fiscal Policy in India,
Centre state Finance Relations,
Finance commission in India
LPG policy in India

5. EXTERNAL SECTOR IN INDIA

India's foreign trade value composition and direction,
India Balance of payment since 1991,
FDI in India,

Impact of Globalization on Indian Economy,
WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand & Co.Ltd. New Delhi.
2. Mishra S. K & V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

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ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	IT 51002 (Same in All Branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

•To acquire knowledge of basic economics to facilitate the process of economic decision making.
•To acquire knowledge on basic financial management aspects.
•To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

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

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting datafor managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS

1. INTRODUCTION:

Managerial Economics;
Relationship with other disciplines;
Firms: Types, objectives and goals;
Managerial decisions;
Decision analysis.

2. DEMAND & SUPPLY ANALYSIS:

2.1. Demand;
- 2.1.1. Types of demand;
- 2.1.2. Determinants of demand;
- 2.1.3. Demand function;
- 2.1.4. Demand elasticity;
- 2.1.5. Demand forecasting;

2.2. Supply;
- 2.2.1. Determinants of supply;
- 2.2.2. Supply function;
- 2.2.3. Supply elasticity.

3. PRODUCTION AND COST ANALYSIS:

Production function;
Returns to scale;
Production optimization;
Least cost input; Iso quants;
Managerial uses of production function;
Cost Concepts;
Cost function;
Types of Cost;
Determinants of cost;
Short run and Long run cost curves;
Cost Output Decision;

Estimation of Cost.

4. PRICING:

Determinants of Price;
Pricing under different objectives and different market structures;
Price discrimination;
Pricing methods in practice;
Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

Balance sheet and related concepts;
Profit & Loss Statement and related concepts;
Financial Ratio Analysis;
Cash flow analysis;
Funds flow analysis;
Comparative financial statements;
Analysis & Interpretation of financial statements;
Investments;
Risks and return evaluation of investment decision;
Average rate of return;
Payback Period;
Net Present Value;
Internal rate of return,

REFERENCE BOOKS:

1. Mc Guigan, Moyer and Harris,' Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition,2005.
3. Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
4. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, NewDelhi, 2007.
5. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson SouthWestern, 4th Edition, 2001.

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DATA SCIENCES: DATA WAREHOUSING AND DATA MINING

Course Code	:	IT 50031(Same as CI/CS 50031)
Course Title	:	Data Sciences: Data Warehousing and Data Mining
Number of Credits	:	3(L: 3, T: 0, P: 0)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

Introduce students to the domain of Data Warehousing and Data Mining

COURSE OUTCOMES:

Student will have general idea about Data Warehousing and Data Mining techniques, will be able to explore further and effectively use related tools**.**

COURSE CONTENTS:

UNIT 1:INTRODUCTION

Motivation,
Importance,
Definitions,
Kind of Data,
Data Mining Functionalities,
Kinds of Patterns,
Classification of Data Mining Systems,
Data Mining Task Primitives,
Integration of A Data Mining System with A Database or Data Warehouse System,
Major Issues in Data Mining,
Types of Data Sets and Attribute Values,
Basic Statistical Descriptions of
Data,
Data Visualization,
Measuring Data Similarity.
PREPROCESSING:
Data Quality,
Major Tasks in Data Preprocessing,
Data Reduction,
Data Transformation and Data Discretization,
Data Cleaning and Data Integration.

UNIT 2:DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING

Data Warehouse basic concepts,
Data Warehouse Modeling - Data Cube and OLAP,
Data Warehouse Design and Usage,
Data Warehouse Implementation,
Data Generalization by Attribute-Oriented Induction,
Data Cube Computation.

UNIT 3:PATTERNS, ASSOCIATIONS AND CORRELATIONS

Mining Frequent Patterns,
Associations and Correlations:
Basic Concepts,
Efficient and Scalable Frequent Item set Mining Methods,
Pattern Evaluation Methods,
Applications of frequent pattern and associations.
Frequent Patterns and Association Mining:
A Road Map,
Mining Various Kinds of Association Rules,
Constraint-Based Frequent Pattern Mining,
Extended Applications of FrequentPatterns

UNIT 4:CLASSIFICATION

Basic Concepts,
Decision Tree Induction,

Bayesian Classification Methods,
Rule-Based Classification,
Model Evaluation and Selection,
Techniques to Improve Classification Accuracy:
Ensemble Methods,
Handling Different Kinds of Cases in Classification,
Classification by Neural Networks,
Support Vector Machines,
Pattern-Based Classification,
Lazy Learners (or Learning from Your Neighbors).

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UNIT 5:CLUSTER ANALYSIS

Basic Concepts of Cluster Analysis,
Clustering Structures,
Major Clustering Approaches,
Partitioning Methods,
Hierarchical Methods,
Density-Based Methods,
Model-Based Clustering,
Why outlier analysis,
Identifying and handling of outliers,
Outlier Detection Techniques.
WEB MINING:
Basic concepts of web mining,
different types of web mining,
PAGE RANK Algorithm,
HITS Algorithm

REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
3. Amitesh Sinha, Data Warehousing, Thomson Learning, India.
4. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

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PROGRAMMING IN JAVA

Course Code	:	IT 50032
Course Title	:	Programming in JAVA
Number of Credits	:	3(L: 3, T: 0, P: 0)
Prerequisites	:	IT 4005
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To provide adequate knowledge about object oriented programming concept. Java is an OOP language with a built-in application programming interface (API) that can handle graphics and user interfaces and that can be used to create applications or applets. Because of its rich set of API's, its platform independence, Java can also be thought of as a platform in itself. This course introduces the structure, syntax, and programming paradigm of the Java language and platform.

COURSE OUTCOMES:

Students will be able to write programs and then run those programs on multiple operating systems. One can learn the Java syntax that are most likely to encounter professionally and Java programming idioms used to build robust, maintainable Java application

COURSE CONTENT:

UNIT 1:

Introduction to Java : Basic concepts of Object Oriented ProgrammingObjects and Classes, Encapsulation, Inheritance, Polymorphism
Benefits and Applications of OOP
Java features
Source file, Java Token, Java statements
Compiling and running Java programs

UNIT 2:

Language Basics: Primitive Data Types, Constants, Variables, Integer, Floating, Character, Boolean Type, Declaration and Scope of variables
Arrays, Type Casting, Strings : 1 D Array, 2 D Array, Sting Arrays, String Methods, String Buffer Class
Operators and Expressions: Assignment, Arithmetic, and Unary Operators ,Logical, Relational, and Conditional Operators Arithmetic expressions, Precedence of Arithmetic Expressions, Operator Precedenceand Associativity
Control Statements: Selection, Iteration, break, continue

UNIT 3:

Classes: Declaring Classes, Member Variables, Defining Methods
Objects: Creating and Using Objects
Constructors: Providing Constructors for Classes, Passing Information to a Method or a Constructor
Method Overloading Static Members, Final Variable, Methods and Classes
Garbage Collection: finalize Method Modifiers: Access Modifiers, Other Modifiers

UNIT 4:

Inheritance: Extending a Class, Defining a class, Super keyword
Multilevel Inheritance
Method Overriding, Abstract and final Classes
Visibility Control

UNIT 5:

Interfaces: Defining, Extending and Implementing
Packages: Introduction, Defining and creating
Access Protection

UNIT 6:

Exception Handling:
Exceptions: Introductions, Exceptions types
Syntax of Exception Handling, Using try and catch, throw, throws, and finally

Multithreaded Programming: Creating a Thread - Introduction, Implementing and Extending Threads, Life Cycle of a Thread

REFERENCE BOOKS:

1. Programming with Java. E Balagurusamy , TMH.
2. Let Us Java. Yashvant Kanetkar, BPB Publications.
3. The Complete Reference Java 2. Herbert Schildt, TMH.
4. Thinking in Java. Bruce Eckel.

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ADVANCE COMPUTER NETWORKS

Course Code	:	IT 50041(Same as CS 50041)
Course Title	:	Advance Computer Networks
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

Introduce Advance Networking Concepts, Theories and Tools

COURSE OUTCOMES:

1.Understanding core concepts/theories/algorithms of computer networks

2.Some hands-on capability on various network devices and tools

3 Capability to design and implement a computer network

COURSE CONTENT:

UNIT 1:

Review of Networking Basics;
Advance Topics in IPv4 –
Subnetting,
Multicasting,
Multicast Routing Protocols (IGMP, PIM, DVMRP);
Advance Topics in TCP –
flow management,
congestion avoidance,
protocol spoofing;
IPv6

UNIT 2:

Telecom Networks,
Switching Techniques;
Introduction to
Frame Relay,
ATM,
MPLS;
VSAT Communication –
Star and Mesh architectures,
bandwidth reservation;
Wireless Networks –
WiFi,
WiMax,
Cellular Phone Technologies –
GSM,
CDMA,
2.6.3. 3G,
2.6.4. 4G

UNIT 3:

Network Redundancy,
Load Balancers,
Caching,
Storage Networks;
QoS;
Network Monitoring –
SNMP,
RMON;

UNIT 4: ADVANCE SCRIPTING

Introduction to Network Security –
- VLAN,
- VPN,
- Firewall,
- IPS,
- Proxy Servers

UNIT 5: PHP

Network Simulation,
Network design case studies and exercises,
IP Addressing schema,
Protocol Analysers (Wireshark, etc)

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REFERENCE BOOKS:

1. RFCs and Standards Documents (www.ietf.org and other standard body websites)
2. Communication Networking – An Analytical Approach, Anurag-Manjunath-Joy
3. TCP/IP Illustrated (Vol.1,2), Stevens
4. Data Networks, Bertsekas-Gallager
5. An Engineering Approach to Computer Networking, S. Keshav

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CLOUD COMPUTING

Course Code	:	IT 50042
Course Title	:	Cloud Computing
Number of Credits	:	3(L: 3, T: 0, P: 0)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

This course offers a good understanding of cloud computing concepts and challenges faced in implementation of cloud computing.

COURSE OUTCOMES:

After undergoing the subject, a student would be able to:

- Explain core concepts of cloud computing paradigm.
- Explain various Service Models
- Explain various Deployment Models.
- Describe SLA management in Cloud Computing
- Explain and apply the concept of virtualization.

COURSE CONTENT:

1. **Introduction**
   - Evolution of Cloud Computing
   - Cloud Computing Overview
   - Characteristics
   - Applications
   - Benefits
   - Challenges
2. **Service and Deployment Models**
   - Cloud Computing Service Models:
     - Infrastructure as a Service
     - Platform as a Service
     - Software as a Service
   - Cloud Computing Deployment Models:
     - Private Cloud; Public Cloud
     - Community Cloud
     - Hybrid Cloud
     - Major Cloud Service providers
3. **Service Level Agreement (SLA) Management**
   - Overview of SLA
   - Types of SLA
   - SLA Life Cycle
   - SLA Management Process
4. **Virtualization**
   - Overview of Virtualization
   - Types of Virtualization
   - Benefits of Virtualization
   - Hypervisors
5. **Cloud Security**
   - Infrastructure Security
   - Data Security & Privacy Issues
   - Legal Issues in Cloud Computing

REFERENCE BOOKS:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski (Editors): Cloud Computing: Principles and Paradigms, Wiley, 2011
2. Kumar Saurabh, Cloud Computing, Wiley, 2012.
3. Barrie Sosinsky: Cloud Computing Bible, Wiley, 2011.
4. Judith Hurwitz, Robin Bloor, Marcia Kaufman,Fern Halper: Cloud Computing for Dummies, Wiley, 2010.

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DATA SCIENCES: DATA WAREHOUSING AND DATA MINING LAB

Course Code	:	IT 50051(Same as CS 50051)
Course Title	:	Data Sciences: Data Warehousing and Data Mining Lab
Number of Credits	:	1(L: 0, T: 0, P: 2)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

Introduce students to the practical domain of Data Warehousing and Data Mining.

COURSE CONTENT:

S.No.	Topics for Practice
1	Study and explore WEKA environment.
2	Create .arff file using WEKA.
3	Demonstration of pre-processing of .arff file.
4	Demonstrateperforming association rule mining on data sets.
5	Demonstrate performing classification on data sets.
6	Demonstrate performing clustering on data sets.
7	Demonstrate performing Regression on data sets.
8	Demonstration of association rule mining.
9	Perform classification using Bayesianclassification algorithm.
10	Perform the cluster analysis by k-means method.

REFERENCE BOOKS:

5. Jiawei Han, MichelineKamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
6. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
7. AmiteshSinha, Data Warehousing, Thomson Learning, India.
8. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

COURSE OUTCOMES:

Student will have general idea about Data Warehousing and Data Mining tool (WEKA), will be able to explore further and effectively use related tools.

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PROGRAMMING IN JAVA LAB

Course Code	:	IT 50052
Course Title	:	Programming in Java lab
Number of Credits	:	1(L: 0, T: 0, P: 2)
Prerequisites	:	IT 4010
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To introduce students to the domain of Java language Programming

COURSE OUTCOMES:

Student will have general idea about Java language Programming

COURSE CONTENT:

S.No.	Topics for Practice
1	Practice for compiling and running simple Java Programs
2	Practice for using java basics
3	Practice for creating simple class and its objects
4	Practice for creating methods and constructors.
5	Practice for static classes and methods
6	Practice for extending class
7	Practice for creating and using Abstract Class
8	Practice for creating and using of Interfaces and Packages
9	Practice for creating and using Exception Handling
10	Practice for creating and using Threads

REFERENCE BOOKS:

1. Programming with Java. E Balagurusamy , TMH.
2. Let Us Java. Yashvant Kanetkar, BPB Publications.
3. The Complete Reference Java 2. Herbert Schildt, TMH.
4. Thinking in Java. Bruce Eckel.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

VI SEMESTER

(SESSION 2021-2022 & ONWARDS)

ENTREPRENEURSHIP AND START-UPS

Course Code	IT 6111(Same in All Branches of Engg.)
Course Title	Entrepreneurship and Start-ups
Number of Credits	4 (L-3 ,T-1, P-0)
Prerequisites (Course code)	None
Course Category	HS

COURSE LEARNING OBJECTIVES:

1. Acquiring Entrepreneurial spirit and resourcefulness.
2. Familiarization with various uses of human resource for earning dignified means of living.
3. Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
4. Acquiring entrepreneurial quality, competency, and motivation.
5. Learning the process and skills of creation and management of entrepreneurial venture.

LEARNING OUTCOME:

Upon completion of the course, these student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. Strategic Marketing Planning
6. New Productor Service Development
7. Business Plan Creation

COURSE CONTENTS:

1. INTRODUCTION TO ENTREPRENEURSHIP AND START–UPS

Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
Types of Business Structures,
Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION

Discovering ideas and visualizing the business
Activity map
Business Plan

3. IDEA TO START-UP

Market Analysis– Identifying the target market,
Competition evaluation and Strategy Development,
Marketing and accounting,
Risk analysis

4. MANAGEMENT

Company's Organization Structure,
Recruitment and management of talent.
Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS

Financing methods available for start-ups in India
Communication of Ideas to potential investors– Investor Pitch
Patenting and Licenses

6. EXIT STRATEGIES FOR ENTREPRENEURS ,BANKRUPTCY, AND SUCCESSION AND HARVESTING STRATEGY

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN–978-0984999392
2.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN–978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN–978-0755388974
4.	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN:978-142219602

SUGGESTEDSOFTWARE/LEARNINGWEBSITES:

a. https://www.fundable.com/learn/resources/guides/startup
b. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatehstructure/
c .https://www.finder.com/small-business-finance-tips
d. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

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PROJECT MANAGEMENT

CourseCode	IT 62001(Same in All Branches of Engg.)
CourseTitle	Project Management
NumberofCredits	3(L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.

•To develop an understanding of key project management skills and strategies.

COURSE OUTCOMES

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

CO1	Understand the importance of projects and its phases.
CO2	Analyze projects from marketing, operational and financial perspectives.
CO3	Evaluate projects based on discount and non-discount methods.
CO4	Develop network diagrams for planning and execution of a given project.
CO5	Apply crashing procedures for time and cost optimization.

COURSE CONTENTS

1. **CONCEPT OF A PROJECT**:
   Classification of projects
   Importance of project management
   The project Life cycle
   Establishing project priorities (scope-cost-time)
   Project priority matrix
   Work break down structure.

2. **CAPITAL BUDGETING PROCESS:**
   Planning -Analysis-Selection-Financing-Implementation-Review.
   Generation and screening of project ideas
   Market and demand analysis
   Demand forecasting techniques.
   Market planning and marketing research process
   Technical analysis

3. **FINANCIAL ESTIMATES AND PROJECTIONS:**
   Cost of projects
   Means of financing
   Estimates of sales and production-cost of production
   Working capital requirement and its financing
   Profitability project , cash flow statement and balance sheet.
   Breakeven analysis.

4. **BASIC TECHNIQUES IN CAPITAL BUDGETING**:
   Non discounting and discounting methods
   pay-back period
   Accounting rate of return
   Net present value
   Benefit cost ratio
   Internal rate of return.
   Project risk.
   Social cost benefit analysis andeconomic rate of return.
   Non-financial justification of projects**.**

5. **PROJECT ADMINISTRATION**:
   Progress payments,
   Expenditure planning,

Project scheduling and network planning,
Use of Critical Path Method(CPM),
Schedule of payments and physical progress,
time-cost trade off.
Concepts and uses of PERT
Cost as a function of time,
Project Evaluation and Review Techniques
Cost mechanisms.
Determination of least cost duration.
Post project evaluation.
Introduction to various Project management softwares.

REFERENCE BOOKS

1.Project planning, analysis, selection, implementation and review –Prasannachandra–Tata McGraw Hill
2.Project Management – the Managerial Process– Clifford F. Gray & Erik W. Larson-McGrawHill
3.Project management- David I Cleland- Mcgraw Hill International Edition, 1999
4. Project Management– Gopala krishnan– Mcmillan India Ltd.
5.Project Management- Harry – Maylor – Peason Publication

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RENEWABLE ENERGY TECHNOLOGIES

CourseCode	IT 62002 (Same in All Branches of Engg.)
CourseTitle	Renewable Energy Technologies
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

•To understand present and future scenario of world energy use.
•To understand fundamentals of solar energy systems.
•To understand basics of wind energy.
•To understand bio energy and its usage in different ways.
•To identify different available non-conventional energy sources.

COURSE OUTCOMES

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

CO1	Understand present and future energy scenario of the world.
CO2	Understand various methods of solar energy harvesting.
CO3	Identify various wind energy systems.
CO4	Evaluate appropriate methods for Bio energy generations from various Bio wastes.
CO5	Identify suitable energy sources for a location.

COURSE CONTENTS

1. **INTRODUCTION:**

World Energy Use;
Reserves of Energy Resources;
Environmental Aspects OF Energy Utilisation;
Renewable Energy Scenario in India and around the World;
Potentials; Achievements/ Applications;
Economics of renewable energy systems.

2. **SOLAR ENERGY:**

Solar Radiation;
Measurements of Solar Radiation;
Flat Plate and Concentrating Collectors;
Solar direct Thermal Applications;
Solar thermal Power Generation
Fundamentals of Solar Photo Voltaic Conversion;
Solar Cells;
Solar PV Power Generation;
Solar PV Applications.

3. **WIND ENERGY:**

Wind Data and Energy Estimation;
Types of Wind Energy Systems;
Performance; Site Selection;
Details of Wind Turbine Generator;
Safety and Environmental Aspects.

4. **BIO-ENERGY:**

Bio mass direct combustion;
Bio mass gasifiers;
Bio gas plants;
Digesters;
Ethanol production;
Bio diesel;
Cogeneration;

Bio mass Applications.

5. OTHER RENEWABLE ENERGY SOURCES:

Tidal energy;
Wave Energy;
Open and Closed OTEC Cycles;
Small Hydro Geothermal Energy;
Hydrogen and Storage;
Fuel Cell Systems;
Hybrid Systems.

REFERENCE BOOKS

1. Non-Conventional Energy Sources, Rai. G. D., Khanna Publishers, New Delhi, 2011.
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN SponLtd.,UK,2 006.
3. Solar Energy, Sukhatme. S. P., Tata Mc Graw Hill Publishing CompanyLtd. ,New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, G N Tiwari and M K Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment A Policy Analysis for India ,NH Ravindranath, U K Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, R A Ristinen and J J Kraushaar, second edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, J W T widell and A D Weir, ELBS, 2006.

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PRODUCT DESIGN

Course Code	IT 63001(Same in All Branches of Engg.)
Course Title	Product Design
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

•To acquire the basic concepts of product design and development process
•To understand the engineering and scientific process in executing a design from concept to finished product
•To study the key reasons for design or redesign.

COURSE OUTCOMES

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

CO1	Understand the basic concepts of product design and development process.
CO2	Illustrate the methods to define the customer needs.
CO3	Describe an engineering design and development process.
CO4	Understand the intuitive and advanced methods used to develop and evaluate a concept.
CO5	Apply modelling and embodiment principles in product design and development process.

COURSE CONTENTS

1. **DEFINITION OF A PRODUCT**

Types of product;
Levels of product;
Product-market mix;
New product development (NPD) process;
Idea generation methods;
Creativity;
Creative attitude;
Creative design process;
Morpho logical analysis;
Analysis of inter-connected decision areas;
Brain storming.

2. **PRODUCT LIFECYCLE;**

The challenges of Product development;
Product analysis;
Product characteristics;
Economic considerations;
Production and Marketing aspects;
Characteristics of successful Product development;
Phases of a generic product development process;
Customer need identification;
Product development practices and industry-product strategies.

3. **PRODUCT DESIGN**

Design by evolution;
Design by innovation;
Design by imitation;
Factors affecting product design;
Standards of performance and environmental factors;
Decision making and iteration;
Morphology of design (different phases);
Role of aesthetics in design.

4. **INTRODUCTION TO OPTIMIZATION IN DESIGN**

Economic factors in design;
Design for safety and reliability;

Role of computers in design;
Modeling and Simulation;
The role of models in engineering design;
Mathematical modeling;
Similitude and scale models;
Concurrent design;
Six sigma and design for six sigma;
Introduction to optimization in design;
Economic factors and financial feasibility in design;
Design for manufacturing;
Rapid Proto typing (RP);
Application of RP in product design;
Product Development versus Design.

5. DESIGN OF SIMPLE PRODUCTS DEALING WITH VARIOUS ASPECTS OF PRODUCT DEVELOPMENT;

Design Starting from need till the manufacture of the product

REFERENCE BOOKS

1. Product Design and Development, Karl T.Ulrichand Steven D.Eppinger, TataMc Graw–Hill edition.
2. Engineering Design– George E. Dieter.
3. An Introduction to Engineering Design methods Vijay Gupta.
4. Merie Crawford: New Product management, McGraw-Hill Irwin.
5. Chitale A K and Gupta R C," Product Design and Manufacturing", Prentice Hall of India, 2005.
6. Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pears on education.

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DISASTER MANAGEMENT

Course Code	IT 63002(Same in All Branches of Engg.)
Course Title	Disaster Management
Number of Credits	3 (L: 3, T: 0 ,P :0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

Following are the objectives of this course:

•To learn about various types of natural and man-made disasters.
•To know pre and post-disaster management for some of the disasters.
•To know about various information and organizations in disaster management in India.
•To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

After competing this course, student will be:
Acquainted with basic information on various types of disasters
Knowing the precautions and awareness regarding various disasters
Decide first action to be taken under various disasters
Familiarised with organization in India which are dealing with disasters
Able to select IT tools to help in disaster management

COURSE CONTENTS

1. UNDERSTANDING DISASTER

Understanding the Concepts and definitions of Disaster,
Hazard,
Vulnerability,
Risk,
Capacity–Disaster and Development,
Disaster management.

2. TYPES, TRENDS, CAUSES, CONSEQUENCES AND CONTROL OF DISASTERS

Geological Disasters (earth quakes, land slides, tsunami, mining);
Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hailstorms, avalanches, droughts, cold and heat waves)
Biological Disasters (epidemics, pest attacks, forest fire);
Technological Disasters (chemical, industrial, radiological, nuclear)
Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters)
Global Disaster Trends
Emerging Risks of Disasters
Climate Change and Urban Disasters.

3. DISASTER MANAGEMENT CYCLE AND FRAME WORK

Disaster Management Cycle
Paradigm Shift in Disaster Management.
Pre-Disaster
Risk Assessment and Analysis,
Risk Mapping,
Zonation and Microzonation,
Prevention and Mitigation of Disasters,
Early Warning System
Preparedness,
Capacity Development;
Awareness.
During Disaster
Evacuation
Disaster Communication
Search and Rescue
Emergency Operation Centre

Incident Comm and System
Relief and Rehabilitation
Post-disaster
Damage and Needs Assessment,
Restoration of Critical Infra structure
Early Recovery Reconstruction and Redevelopment;
IDNDR, Yokohama Stretegy, Hyogo Frame-work of Action.

4. DISASTER MANAGEMENT IN INDIA

Disaster Profile of India
Mega Disasters of India and Lessons Learnt.
Disaster Management Act 2005
Institutional and Financial Mechanism,
National Policy on Disaster Management,
National Guidelines and Plans on Disaster Management;
Role of Government (local, state and national),
Non-Government and Inter Governmental Agencies

5. APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT

Geo informatics in Disaster Management (RS, GIS, GPS and RS).
Disaster Communication System (Early Warning and Its Dissemination).
Land Use Planning and Development Regulations,
Disaster Safe Designs and Constructions,
Structural and Non Structural Mitigation of Disasters
S & T Institutions for Disaster Management in India

REFERENCES

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guide lines for Disaster Management
2. Bhandani, R. K., An over view on natural & man-made disasters and their reduction, CSIR, New Delhi
3.Srivastava, H. N., and Gupta G. D. , Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4.Alexander, David, Natural Disasters, Kluwer Academic London
5.Ghosh, G .K. ,Disaster Management, APH Publishing Corporation
6.Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

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INDIAN CONSTITUTION

CourseCode	IT 6333(Same in All Branches of Engg.)
CourseTitle	Indian Constitution
NumberofCredits	0 (L:2,T:0;P:0)
Prerequisites(Coursecode)	None
CourseCategory	AU

COURSE CONTENT

1. THE CONSTITUTION –

Introduction
The History of the Making of the Indian Constitution
Preamble and the Basic Structure, and its interpretation
Fundamental Rights and Duties and their interpretation
State Policy Principles

2. UNION GOVERNMENT

Structure of the Indian Union
President– Role and Power
Prime Minister and Council of Ministers
Lok Sabha and Rajya Sabha

3. STATE GOVERNMENT

Governor– Role and Power
Chief Minister and Council of Ministers
State Secretariat

4. LOCAL ADMINISTRATION

District Administration
Municipal Corporation
Zila Panchayat

5. ELECTION COMMISSION

Role and Functioning
Chief Election Commissioner
State Election Commission

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi, 2008
2.	The Constitution of India	B.L.Fadia	Sahitya Bhawan; New edition(2017)
3.	Introduction to the Constitution of India	D D Basu	Lexis Nexis; Twenty-Third 2018 edition

SUGGESTED SOFTWARE / LEARNING WEBSITES:

1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

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DOT NET TECHNOLOGY

Course Code	:	IT 60011
Course Title	:	Dot Net Technology
Number of Credits	:	3(L: 3, T: 0, P: 0)
Prerequisites	:	IT 4005
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

Dot NET has evolved as an important framework in the recent times for developing windows, web and enterprise applications.

The objective of the subject is to introduce .NET technology which provides a multi-language environment to develop windows based software. The main focus is on .NET framework, development environment as VB.NET, ASP.NET.

COURSE OUTCOMES:

Student will have general idea about Dot NET technology, will be able to explore further, effectively use related tools and have basic implementation skills.

COURSE CONTENT:

UNIT 1:

Introduction to .NET Framework and Development Environment
Comparison between .NET and Java
Architecture and Advantages of .NET framework
Namespaces
Object Oriented Features
Visual Studio.NET Integrated Development
Elements of IDE
Writing a Simple Application using .NET

UNIT 2:

Introduction to and Features of VB.NET
Similarities and Differences between Visual Basic and VB.NET
Data types supported in VB.NET
Variables, Scope of Variables
Access Control: Public, Private, Protected, Friend, Protected Friend
Various Operators: Arithmetic, Comparison, Assignment, Logical Operators, Concatenation Operators, Operator Precedence

UNIT 3:

Programming Concepts of VB.NET: Control Structures: Decision Making Statements, Looping Statements, Other Statements
Arrays: Static, Dynamic Arrays, Array Functions
Procedures and Functions
Parameter Passing: Pass-by-Value, Pass-by-Reference, Optional and Named Arguments
Predefined Functions: MsgBox( ), InputBox( ), and other functions

UNIT 4:

Introduction to Object Oriented Features of VB.NET: Class, Objects, Overloading, Overriding, Structure
Structure: Similarities and Differences with Class
Overloading the Methods
Shared Members
Inheritance
Abstract Base Class
Interfaces: Differences between Interface and Class

UNIT 5:

Introduction to Windows FORMS and Controls

Windows Forms: Properties and Methods, Events, MDI Forms
Properties and Methods Controls: Label, TextBox, LinkLabel, Button, Radio Button, CheckBox, ListBox, ComboBox, Timer control, Scroll bars, Menu
Exception Handling

UNIT 6:

Database Connectivity using ADO._NET: Evolution and Features of ADO.NET
ADO.NET Object Model
Life Cycle of a Thread
Overview of Data Provider, Provider Objects: Connection, Command, Data Adapter, Data Reader
Overview of DataSet, Types of DataSets
Data Object Model and Data Object Model
Using Command Objects
Data Binding : Simple Binding, Complex Binding
Introduction to ASP.NET
Differences and Similarities between ASP and ASP.NET
Characteristics of ASP.NET
Architecture of ASP.NET

REFERENCE BOOKS:

1 Essentials of .NET Programming, C. Komalavalli, Sanjib K Sahu, Ane Books Pvt. Ltd., New Delhi.
2 Visual Basic.NET, Shirish Chavan, Pearson Education, New Delhi.
3 Introduction to Visual Basic.NET, NIIT (PHI).
4 ASP.NET and VB.NET Web Programming, Matt J. Crouch , Pearson Education, New Delhi.
5 Programming VB.NET, Cornell, Gary, IDG.

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SOFTWARE TESTING

Course Code	:	IT 60012(Same as CS 60012)
Course Title	:	Software Testing
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	CS 404
Course Category	:	PE

COURSE LEARNING OBJECTIVES:
Essential software testing knowledge and skills, required to reasonably test a system under Development in a systematic manner.

COURSE OUTCOMES:
Student will develop skills to understand the system, choose suitable testing methods, strategies, tools and technology, execute and report the test. Student will also be able to understand need and usage of test automation and gain expertise in at least 1 test automation tool

COURSE CONTENTS:
As per the course design, concepts learned in this course will/should be used in the major project (Proj.202).

UNIT 1: Basics

Introduction to Software Quality basics
Verification and validation
quality perspectives
Testing terminology
Software Testing Life Cycle (STLC)
"V" model of Testing,
QA process, cost of testing, types of tests

UNIT 2: Writing Test Cases

Writing test cases
Functional Testing, non-functional testing, (Performance testing), UI testing.
Preparing test data, Writing Unit test, Integration test and User Acceptance Tests
Preparing test scenarios from Software requirements

UNIT 3: Test Execution and Management

Test execution
Test Oracles
Test planning, test strategy including when to stop testing
test-coverage- Traceability matrix, JIRA, Bugzilla and other bug tracking tools.
Test data mining
Test reporting.

UNIT 4: Test Automation

Why automation
when not to automate
writing simple automated test cases,
learn and practice any one automated testing framework like Selenium

UNIT 5: Other quality Assurance

Quality and Defect management - Code reviews,
Quality tools
Change management
Version control

SUGGESTED LAB WORK:
Writing and executing test cases of different types for a sample system, may be for the minor project done earlier; using Bugzilla to report cases; writing performance test cases for different types of test (load, stress, benchmarking, etc.); Writing automated test for UI, writing-executing test scripts for a sample system.

REFERENCE BOOKS/RESOURCES:

1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
2. Bugzilla (https://www.bugzilla.org/)
3. JIRA (https://www.atlassian.com/software/jira)

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DOT NET TECHNOLOGY LAB

Course Code	:	IT 60021
Course Title	:	Dot Net Technology Lab
Number of Credits	:	1(L: 0, T: 0, P: 2)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To introduce students to the domain of Dot Net Programming.

COURSE OUTCOMES:

Student will have general idea about Dot Net Programming.

COURSE CONTENT:

S.No.	Topics for Practice
1	Practice programs on VB.NET using variables and operators.
2	Practice programs on VB.NET using conditional and control structures.
3	Practice programs on VB.NET using Arrays.
4	Practice programs on VB.NET using Inheritance property.
5	Practice programs on VB.NET using Forms.
6	Practice programs on VB.NET using Controls.
7	Practice programs on Database connectivity using ADO.NET.
8	Practice programs on Data Access through ASP.NET
9	Practice programs on ASP.NET using web controls.
10	Practice programs on ASP.NET using Event-handling.
11	Practice programs on ASP.NET using Cookies.

REFERENCE BOOKS:

1 Essentials of .NET Programming, C. Komalavalli, Sanjib K Sahu, Ane Books Pvt. Ltd., New Delhi.
2 Visual Basic.NET, Shirish Chavan, Pearson Education, New Delhi.
3 Introduction to Visual Basic.NET, NIIT (PHI).
4 ASP.NET and VB.NET Web Programming, Matt J. Crouch , Pearson Education, New Delhi.
5 Programming VB.NET, Cornell, Gary, IDG.

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SOFTWARE TESTING LAB.

Course Code	:	IT 60022 (Same as CS 60022)
Course Title	:	Software Testing Lab
Number of Credits	:	1(L: -, T: 0, P: 2) Lab
Prerequisites	:	CS 404
Course Category	:	PE

COURSE LEARNING OBJECTIVES:
Essential software testing knowledge and skills, required to reasonably test a system under Development in a systematic manner.

COURSE OUTCOMES:
Student will develop skills to understand the system, choose suitable testing methods, strategies, tools and technology, execute and report the test. Student will also be able to understand need and usage of test automation and gain expertise in at least 1 test automation tool

COURSE CONTENTS:

1. Test cases of different types for a sample system, may be for the minor project done earlier; using Bugzilla to report cases
2. Writing performance test cases for different types of test (load, stress, benchmarking, etc.)
3. Writing automated test for UI
4. Writing-executing test scripts for a sample system.

REFERENCE BOOKS/RESOURCES:

4. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
5. Bugzilla (https://www.bugzilla.org/)
6. JIRA (https://www.atlassian.com/software/jira)

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