Model Curriculum for

B.Voc/ D.Voc

in

Software Development

All India Council for Technical Education
Nelson Mandela Marg, New Delhi

1. Introduction

All India Council for Technical Education (AICTE) Ministry of HRD, Government of India has introduced Entrepreneurship oriented Skill development courses of B.Voc/D.Voc/Skill Diploma. These courses will be run by AICTE approved institutes by using available infrastructure and facilities. In these courses the institute will conduct general education content and sector specific skills will be imparted by Skill Knowledge Providers/ Training Providers/ Industries.

1.1 Key Features:

Objectives

- To provide judicious mix of skills relating to a profession and appropriate content of General Education.
- To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- To integrate NSQF within the Diploma, undergraduate level of higher education to enhance employability of the students and meet industry requirements. Such student apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- To provide vertical mobility to students admitted in such vocational courses.
- The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in Software Development and will be offered by respective affiliating University/Board of Technical Education.
- Students may be awarded Level Certificate/Diploma/Advance Diploma /Degree as out-lined in the Table below:

Award	Duration after class X	Corresponding NSQF level
Level 3 Certificate	1 Year	3
Level 4 Certificate	2 Years	4
Diploma	3 Year	5
Advance Diploma	4 Years	6
B.Voc Degree	5 Years	7

2. Course Objectives

After successfully completing the vocational course, the student would have acquired relevant appropriate and adequate technical knowledge together with the professional skills and competencies in the field of Software Development so that he/she is properly equipped to take up gainful employment in this Vocation. Thus he/she should have acquired: -

A. Understanding of

(a) The relevant basic concepts and principles in basic science subjects (Physics, Chemistry and Mathematics) so that he/she is able to understand the different vocational subjects.

(b) The basic concepts in engineering drawing.

(c) The concepts, principles of working of basic electronic devices and circuits.

(d) The knowledge of testing procedure of components and circuits by making use of different test instruments.

(e) The procedure of making P.C.B.

(f) The concepts and principles used in Radio/Audio/Video Systems and Communication devices and its maintenance.

B. Adequate Professional Skills and Competencies in

(a) Testing different software's.

(b) Testing the performance of electronic circuits.

(c) Locating the fault at component level and at the stage level.

C. A Healthy and Professional Attitude so that He/She has

(a) An analytical approach while working on a job.

(b) An open mind while locating/rectifying faults.

(c) Respect for working with his/her own hands.

(d) Respect for honesty, punctuality and truthfulness

D. NSQF compliant skills in Qualification developed by sector skill council in IT/ITeS sector

3. Course Structure

The course will consist of combination of practice, theory and hands on skills in the IT/ITeS sector.

Curriculum
The curriculum in each of the years of the programme would be a suitable mix of general education and skill components.

Skill Components:

- The focus of skill components shall be to equip students with appropriate knowledge, practice and attitude, to become work ready. The skill components will be relevant to the industry as per its requirements.

- The curriculum will necessarily embed within itself, National Occupational Standards (NOSs) of specific job roles within the industry. This would enable the students to meet the learning outcomes specified in the NOSs.

- The overall design of the skill development component along with the job roles selected will be such that it leads to a comprehensive specialization in few domains.

- The curriculum will focus on work-readiness skills in each of the year of training.

- Adequate attention will be given in curriculum design to practical work, on the job training, development of student portfolios and project work.

General Education Component:
- The general education component adhere to the normal senior secondary and university standards. It will emphasize and offer courses which provide holistic development. However, it will not exceed 40% of the total curriculum.
- Adequate emphasis is given to language and communication skills.

The curriculum is designed in a manner that at the end of each year after classXth students can meet below mentioned level descriptors of NSQF:

Level	Process required	Professional Knowledge	Professional skill	Core skill	Responsibility
Level 3	Person may carry put a job which may require limited range of activities routine and predictable	Basic facts, process and principle applied in trade of employment	Recall and demonstrate practical skill, routine and repetitive in narrow range of application	Communication written and oral with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment	Under close supervision some responsibility for own work within defined limit
Level 4	Work in familiar, predictable, routine, situation of clear choice	Factual knowledge of field of knowledge or study	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment	Responsibility for own work and learning
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools materials and information	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and learning and some responsibility for other's works and learning

Level 6	Demands wide range of specialized technical skill, clarity of knowledge and practice in broad range of activity involving standard/ non-standard practices	Factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Reasonably good in mathematical calculation, understanding of social, political and reasonably good in data collecting organizing information, and logical communication	Responsibility for own work and learning and full responsibility for other's works and learning
Level 7	Requires a command of wide ranging specialized theoretical and practical skill, involving variable routine and non-routine context	Wide ranging, factual and theoretical knowledge in broad contexts within a field of work or study	Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Good logical and mathematical skill understanding of social political and natural environment good in collecting and organizing information, communication and presentation skill	Full responsibility for output of group and development

Curriculum for Software Development

Level	Code	Educational Component	Credit	Marks
3 **Semester I**		**Theory**		
	3.GE.01	Language-I	3	50
	3.GE.02	Applied Chemistry	3	50
	3.GE.03	Applied Physics	3	50
	3.GE.04	Applied Maths - I	3	50
		Lab/Practical		
	3.GP.01	Applied Chemistry Lab	1	25
	3.GP.02	Applied Physics Lab	1	25
	3.VP.01	IT-Tools Practical	1	50
	On-Job-Training (OJT)/Qualification Packs			
	Domestic Data Entry Operator (SSC/Q2212)	(Any one)	15	200
	Domestic IT helpdesk Attendant (SSC/Q0110)			
	CRM Domestic Voice (SSC/Q2210)			
3 **Semester II**		**Theory**		
	3.GV.01	General Foundation Course –I	3	50
	3.GV.02	Basic Electricity	3	50
	3.GV.03	Basic Electronics	3	50
	3.GV.04	Applied Mathematics -II	3	50
		Lab/Practical		
	3.VP.02	Basic Electricity Lab	1.5	50
	3.VP.03	Basic Electronics Lab	1.5	50
	On-Job-Training (OJT)/Qualification Packs			
	Any one of the QP's can be opted as offered in Semester I	(Any one)	15	200
4 **Semester I**		**Theory**		
	4.GV.01	General Foundation Course	3	50
	4.GV.02	IT Tools	3	50
	4.GV.03	Web Applications	3	50
	4.GE.01	Language –II	3	50
		Lab/Practical		
	4.VP.01	IT-Tools Lab (Advanced)	1.5	50
	4.VP.02	Web Applications Lab	1.5	50
	On-Job-Training (OJT)/Qualification Packs			
	Media Developer (SSC/Q050)	(Any one)	15	200
	Junior Software Developer (SSC/Q0508)			

Level	Code	Educational Component		Credit	Marks
		CRM Domestic Non-Voice (SSC/Q2211)			
4 **Semester** **II**		**Theory**			
	4.GV.04	Database Management Systems (795)		3	50
	4.GV.05	Digital Electronics		3	50
	4.GV.06	Computer Networks		3	50
	4.GV.07	Maintenance of Computer Systems		3	50
		Lab/Practical			
	4.VP.03	Database Management System Lab		1.5	50
	4.VP.04	Maintenance of Computer Systems and Computer Network Lab		1.5	50
		On-Job-Training (OJT)/Qualification Packs			
		Any one of the QP's can be opted as offered in Semester I	(Any one)	15	200
5 **Semester** **I**		**Theory**			
	5.GV.01	IT Foundation and Programming Concepts		3	50
	5.GV.02	Web Designing		3	50
	5.GV.03	Programming in C		3	50
	5.GV.04	Operating System (OS)		3	50
		Lab/Practical			
	5.VP.01	Web Designing Lab		1.5	50
	5.VP.02	C Programming Lab		1.5	50
		On-Job-Training (OJT)/Qualification Packs			
		Technical Writer (SSC/Q0505)	(Any one)	15	200
		Infrastructure Engineer (SSC/Q0801)			
		Associate – CRM (SSC/Q2202)			
5 **Semester** **II**		**Theory**			
	5.GV.05	Data Structures		3	50
	5.GV.06	Concepts of Data Mining		3	50
	5.GV.07	OOPs with Java		3	50
	5.GV.08	Multimedia Tools & Applications		3	50
		Lab/Practical			
	5.VP.03	Data Structure Lab		1.5	50
	5.VP.04	Java Lab		1.5	50
		On-Job-Training (OJT)/Qualification Packs			
		Web Developer (SSC/Q0503)	(Any one)	15	200

Level	Code	Educational Component	Credit	Marks
		Test Engineer (SSC/Q1301)		
6 **Semester I**		**Theory**		
	6.GV.01	Linux Operating System – Operations and Management	3	50
	6.GV.02	Software Engineering	3	50
	6.GV.03	Web Development using PHP	3	50
	6.GV.04	Windows Development Fundamental	3	50
		Lab/Practical		
	6.VP.01	Web Development using PHP Lab	1.5	50
	6.VP.02	Window Development Fundamentals Lab	1.5	50
		On-Job-Training (OJT)/Qualification Packs		
		Junior Data Associate (SSC/Q0401)		
		IP Executive (SSC/Q6201) (Any one)	15	200
		Security Analyst (SSC/Q0901)		
6 **Semester II**		**Theory**		
	6.GV.05	Software Testing and Project Management	3	50
	6.GV.06	Android Application Development	3	50
	6.GV.07	Window Configuration and Server Administration	3	50
	6.GV.08	Management Information Systems	3	50
		Lab/Practical		
	6.VP.03	Android Application Development Lab	1.5	50
	6.VP.04	MIS Lab	1.5	50
		On-Job-Training (OJT)/Qualification Packs		
		QA Engineer (SSC/Q1302) Any one)	15	200
		Software Engineer (SSC/Q4601)		
7 **Semester I**		**Theory**		
	7.GV.01	Technology Trends in IT	3	50
	7.GV.02	Window Mobile Application Development	3	50
	7.GV.03	Introduction to Python Programming	3	50
	7.GV.04	Introduction to Microprocessors	3	50
		Lab/Practical		
	7.VP.01	Window Mobile Application Development Lab	1.5	50

Level	Code	Educational Component		Credit	Marks
	7.VP.01	Python Programming Lab		1.5	50
	On-Job-Training (OJT)/Qualification Packs				
	Management Trainee (SSC/Q6301)		(Any one)	15	200
	Associate - Transactional F&A (SSC/Q2301)				
	Consultant Network Security (SSC/Q0917)				
7 **Semester II**	**Theory**				
	7.GV.05	Introduction to AI		3	50
	7.GV.06	e-Commerce		3	50
	7.GV.07	Computer Network Security		3	50
	7.GV.08	Introduction to Biometrics		3	50
	Lab/Practical				
	7.VP.03	AI Lab		1.5	50
	7.VP.04	Computer Network Security Lab		1.5	50
	On-Job-Training (OJT)/Qualification Packs				
	Master Trainer for Software Developer (SSC/Q0509)		(Any one)	15	200
	Hardware Engineer (SSC/Q4701)				

Detailed Curriculum

Level 3 (Semester I)

(3.GE.01) Language - I

Module 1: Reading comprehension (prescribed texts) and functional grammar

A variety of genres – short stories, expository pieces, biographies, poems, plays, newspaper and magazine excerpts have been included. Teaching of grammar has been integrated with the reading texts. The emphasis is on functional grammar.

The following ten prose texts and five poems have been selected for development of different reading skills.

Prose texts (Prescribed)
1. A warmer or a colder earth (popular science) Arthur – C. Clark
2. The tiger in the tunnel (narrative) – Ruskin Bond.
3. First two or four pages from Sunny Days (autobiographical) – By Sunil Gavaskar
4. Case of suspension (narrative)
5. Big brother (narrative) Shekhar Joshi
6. Father, dear father (news paper article form the Hindu)
7. Face to face (autobiographical) Ved Mehta
8. I must know the truth (narrative) Sigrun Srivastva
9. If I were you (play) Douglas James
10. India, her past and her future (speech) Jawahar Lal Nehru

Poems
1. Leisure – W H Davis
2. The road not taken – Robert Frost
3. Where the mind is without fear- Tagore
4. My grandmother's house – Kamla Das
5. The night of the scorpion – Nissi, Ezekiel

Non prescribed

In this section learners will be exposed to newspaper, articles, tables, diagrams, advertisements etc. which they have to read carefully and interpret. In the examination similar pieces will be used.

Grammar and usage:

The following points of grammar and usage have been selected from the reading passages.
1. agreement/concord: number – gender etc.
2. Tenses: simple past (negatives/interrogatives) present perfect, past perfect continuous, past perfect, expressing future time (will and going to)
3. Passive voice (perfect tenses and modals)
4. Modals (must, should ought to, would)
5. Linking words (to like because although, instead of, if, as, since, who, which that, when however, inspite of)
6. Reported speech, statements, questions (yes/no)

Module 2: Functional writing and study skills

This module help the learner to write descriptive and narrative paragraph, letters, reports notices etc. and also practice skills of note making

1. Paragraph writing
   - Describing objects
   - Describing people
   - Narrating events, stories
2. Letter writing
   - Application for leave
   - Application for jobs
   - Asking for information form various agencies (e.g. Last date for getting prospects; price of items before placing doers etc.)
3. Note making
4. Ending (punctuation, spelling, appropriate vocabulary, structures)

(3.GE.02) Applied Chemistry

1. **Structure of Atom:**

Rutherford model of the structure of atom, Bohr's theory of electrons, quantum numbers and their significance, de-Broglie equation and uncertainty principle, electronic configuration of 1 to 30 elements.

2. **Periodic Properties of Elements:**

Periodic law, periodic table, periodicity in properties like atomic radii and volume, ionic radii, ionization energy and electron affinity. Division of elements into s, p, d and f blocks.

3. **Chemical Bonds:**

Electrovalent, covalent and coordinate bond and their properties. Metallic bonding (electron cloud mode) and properties (like texture, conductance, luster, ductility and malleability).

4. **Fuel and their Classification:**

Definition, characteristics, classification into solid, liquid and gaseous fuel. Petroleum and brief idea of refining into various factions and their characteristics and uses. Calorific value of fuel, Gaseous fuels- preparation, properties, composition and use of producer gas, water and oil gas.

5. **Water:**

Impurities in water, methods of their removal, hardness of water, its types, causes and removal, disadvantages of hard water in boilers, pH value and its determination by calorimetric method.

6. **Corrosion:**

Its meaning, theory of corrosion, prevention of corrosion by various methods using metallic and non-metallic coatings.

7. **Plastic and Polymers:**

Plastic-thermo-plastic and thermo-setting. Introduction of Polythene. P.V.C. Nylon, synthetic rubber and phenol-formal-dehyde resin, their application in industry.

(3.GE.03) Applied Physics

1. **Units & Dimensions:** M.K.S. fundamentals & derived units, S.I. base units supplementary units and derived units, Dimensions of various physical quantities, uses of dimensional analysis.

2. **Surface Tension and Viscosity:** molecular forces, molecular theory of surface tension, surface energy, capillary action, concept of viscosity, coefficient of viscosity, principle and construction of viscometers.

3. **Vibrations:** Vibration as simple spring mass system, elementary and qualitative concept of free and forced vibrations, resonance. Effects of vibrations on building bridges and machines members.

4. **Heat:** Temperature and its measurement, thermoelectric, platinum resistance thermometers and pyrometers. Conduction through compound media and laws of radiations.

5. **Ultrasonics:** Productions of ultrasonic waves by magnetostriction and piezo-electric effect, application of ultrasonics in industry.

6. **Optics:** Nature of light, reflection and refraction of a wave from a plane surface. Overhead projector and Epidiascope.

(3.GE.04) Applied Mathematics – I

Sets, Relations and Functions
1. Sets
2. Relations and Functions-I
3. Trigonometric Functions-I
4. Trigonometric Functions-II
5. Relation between Sides and Angles of A triangle

Sequences and Series
1. Sequences and Series
2. Some Special Sequences

Algebra-I
1. Complex Numbers
2. Quadratic Equations and Linear inequalities
3. Principle of Mathematical Induction
4. Permutations and Combinations
5. Binomial Theorem

Co-ordinate Geometry
1. Cartesian System of Rectangular Co-ordinates
2. Straight Lines
3. Circles
4. Conic Sections

Statistics and Probability

1. Measures of Dispersion
2. Random Experiments and Events
3. Probability

(3.GP.01) Applied Chemistry – Lab

1. Proximate analysis of solid fuel.

2. Experiments based on Bomb Calorimeter.

3. Determination of turbidity in a given sample.

4. To determine the flash and fire point of a given lubricating oil.

5. To determine the viscosity of a given lubricating oil by Redwood viscometer.

6. To determine cloud and pour point of a given oil.

(3.GP.02) Applied Physics – Lab

1. To determine the surface tension of a liquid by rise in capillary.

2. To determine the viscosity of a given liquid.

3. To determine the frequency of tuning fork using a sonometer.

4. To determine the frequency of AC main using sonometer.

5. Time period of a cantilever.

(3.VP.01) IT Tools – Lab

- Spreadsheets, Word, Presentation
- Multimedia Design
- Troubleshooting
- Project / Practical File
- Viva Voce

Level 3 (Semester II)

(3.GV.01) General Foundation Course – I

A. Business Management and Entrepreneurship

(a) **Entrepreneurship Orientation**
Importance and relevance in real life: Emphasis on self-employment.

(b) **Entrepreneurship Values and Attitudes**
Innovativeness, Independence, Risk Taking, Analytical ability.

(c) **Entrepreneurial Motivation**
Achievement Planning, personal efficacy, entrepreneurial goal setting.

(d) **Launching of a Business Venture**
Identification of project, steps in setting up a business, information about various institutions providing assistance, project formulation.

B. Computational Skills

(a) Percentage, ratio & proportion, profit & loss, discount, simple and compound interest, population growth and depreciation of value of articles using logarithm.

(b) Area and volume: rectangle, parallelogram, circle, cube, cone, cylinder & sphere.

C. Environmental Education

(a) Environment and the society.

(b) Environment properties risks in different economic enterprises, in use of raw materials, in processing / manufacturing and designing.

(c) Poverty and environment.

D. Rural Development

(a) Agriculture, the back bone of Indian Economy.

(b) Rural development projects in India including Integrated rural development programme.

(c) Agro based rural industries.

(d) Community approach to rural development.

(3.GV.02) Basic Electricity

1. **Current Electricity**
Definition of Resistance, Voltage, Current, Power, Energy and their units, Relation between electrical, mechanical and thermal units, Temperature variation of resistance, Difference between AC and DC voltage and current.

2. **D.C. Circuits**
Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance, Kirchhoff's Laws and their applications.

3. **Electric Cells**
Primary cell, wet cell, dry cell, battery, Li-ion battery, series and parallel connections of cells, Secondary cells, Lead Acid Cell, Discharging and recharging of cells, preparation of electrolyte,

care and maintenance of secondary cells.

4. **Lighting Effects of Current**
   Lighting effect of electric current, filaments used in lamps, and Tubelight, LED, their working and applications.

5. **Capacitors**
   Capacitor and its capacity, Concept of charging and Discharging of capacitors, Types of Capacitors and their use in circuits, Series and parallel connection of capacitors, Energy stored in a capacitor.

6. **Electromagnetic Effects**
   Permanent magnets and Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them.
   Faraday's Laws of Electromagnetic Induction, Dynamically induced e.m.f., its magnitude and induction, inductance and its unit. Mutually induced e.m.f., its magnitude and direction, Energy stored in an inductance.
   Force acting on a current carrying conductor in magnetic field, its magnitude and direction, Principles and construction of dynamo.

7. **A.C Circuits**
   Generation of A.C. voltage, its generation and wave shape. Cycle, frequency, peak value R.M.S. value, form factor, crest factor, Phase difference, power and power factor, A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits.

(3.GV.03) Basic Electronics

i) **Overview of Atom, Sub-Atomic Particles and CRO**
   - Brief History of Electronics.
   - Atom and its elements,
   - Electron, Force, Field intensity, Potential, Energy, current
   - Electric field, Magnetic field, Motion of charged particles in electric and magnetic field.
   - Overview of CRO, Electronic and Magnetic deflection in CRO, Applications.

ii) **Voltage and Current**

   - Resistance, Ohm's law, V-I Characteristics, Resistors, Capacitors, Inductors.
   - Voltage and Current sources, Symbols and Graphical representation
   - Overview of AC, DC, Cells and Batteries, Energy and Power.

iii) **Basics of Semiconductor**
   - Semiconductor materials, Metals and Semiconductors and Photo-electric emission.
   - N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor.
   - PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode.
   - Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator.
   - Introduction to Filters, Clippers, Clampers

iv) **Bipolar Junction Transistor**

- Operation of NPN and PNP transistors, Biasing of BJT.
- CB, CE and CC configuration
- Introduction to FET, JFET, MOSFET, CMOS and VMOS

v) Transistor Amplifier and Applications
- Introduction, Single and Multi-stage amplifiers
- Introduction to Oscillators
- Introduction to Thyristors, PNPN diode, SCR, LASCR, DIAC, TRIAC

(3.GV.04) Applied Mathematics – II

Algebra-II
1. Matrices
2. Determinants
3. Inverse of a Matrix and its Applications

Relations and Functions
1. Relations and Functions-II
2. Inverse Trigonometric Functions

Calculus
1. Limits and Continuity
2. Differentiation
3. Differentiation of Trigonometric functions
4. Differentiation of Exponential and Logarithmic functions
5. Application of Derivatives
6. Integration
7. Definite Integrals
8. Differential Equations

Vectors and Three Dimensional Geometry
1. Introduction to Three Dimensional Geometry
2. Vectors
3. Plane
4. Straight Line

Linear Programming and Mathematical Reasoning
1. Linear Programming
2. Mathematical Reasoning

(3.VP.02) Basic Electricity Lab

1. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross-sectional area of the conductor.
2. Verification of Ohm's Law.
3. Verification of temperature co-efficient of resistance:
   (i) Positive for Tungsten and Nichrome and

(ii)   Negative for carbon.

4.   Study of series resistive circuits.

5.   Study of parallel resistive circuits.

6.   Study of series and parallel connection of cells in circuits.

7.   Preparation of Electrolyte for lead acid battery and its charging and measurement of Specific gravity with the help of hydrometer.

8.   To find heat efficiency of an electric kettle.

9.   Charging and Discharging of a capacitor.

10.   Verification of magnetic field of a Solenoid with:

(i)   Iron core and

(ii)   Air core.

11.   Verification of Faraday's Laws of electromagnetic induction.

12.   Verification of Torque development in a current carrying coil in magnetic field.

13.   Study of R.L. series circuit and measurement of power and power factor.

14.   Study of R.C. series circuit and measurement of power and power factor.

15.   Study of R.L.C. series circuit and measurement of power and power factor.

16.   Study of R.L.C. series circuit for calculation of inductive reactance, capacitive reactance, impedance and Q- Factor.

Instruments Required

- Trainer kit for verifying ohm's law,
- Trainer kit for measuring TCR
- Lead acid battery,
- Hydrometer,
- Electric kettle,
- Trainer kit for measuring power and power factor in RLC circuits

(3.VP.03) Basic Electronics – Lab

1.   Study of current and voltage measurement using Ammeter and Voltmeter.
2.   Study of current and voltage measurement using Galvanometer.
3.   Study of current, voltage and resistance measurement using of Multi-meter
4.   Study of Power and Energy measurement using Wattmeter and Energy meter.
5.   Study of working principle of Signal Generator and measurement of amplitude, time period and frequency of signal using Oscilloscope.
6.   Study of V-I Characteristic of Diode.
7.   Study of V-I Characteristic of Zener Diode. And use of Zener Diode as voltage regulator.
8.   Study of Half wave rectifier with and without filter circuit.
9.   Study of Full wave rectifier with and without filter circuit.
10. Study CE configuration for NPN and PNP transistors and measurement of voltage and current gain.
11. Study CB configuration for NPN and PNP transistors and measurement of voltage and current gain.
12. Study CC configuration for NPN and PNP transistors and measurement of voltage and current gain.

13. Study of working of single layer PCB manufacturing
14. Study of working of double layer PCB manufacturing.
15. Design of 7 segment display using LED and bread board.

Instruments Required

- Ammeter
- Voltmeter,
- Multimeter,
- Galvanometer,
- Energy Meter,
- CRO,
- Diode Trainer kit
- Zener diode Trainer kit
- Rectifier trainer kit
- Transistor charactrics trainer kit,
- PCB manufacturing Lab
- Bread board trainer kit to design 7 segment display.

Level 4 (Semester I)

(4.GV.01) General Foundation Course – II

A. Business Management and Entrepreneurship

Management of Business, Elementary treatment/exposure to basic conceptual frame work of the topic listed below:

(a) Basic Function (b) Marketing Management (c) Financial Management (d) Production Management (e) Personnel Management

B. Computational Skills

1. (a) Solution of linear equations and their application to problem of commercial mathematics.

   (b) System of linear equations and in equation in two variables. Applications in formation of simple linear programming problems.

2. Statistics: Raw data, bar charts and Histogram; Frequency Tables; Frequency Polygon; Ogive;Menu, Median and Mode of ungrouped and grouped data; Standard Deviation; Introduction to Mortality tables; Price Index etc. Introduction to Computers.

C. Environmental Education & Rural Development

   Environmental Education:

   a. Modernization of agriculture and environment, irrigation, water logging, use of fertilizers, pesticides, soil erosion, land degradation (desertification and deforestation), silting and drying of water resources.
   b. Rational utilization, conservation and regeneration of environmental resources (soil, air, water, plant, energy, minerals).

2. Rural Development

Principles and goals of rural development, major problems/constraints in rural development in India.

(4.GV.02) IT Tools

   I. Computer Organization & OS: User perspective.
       • Understanding of Hardware.
       • Basics of Operating System.
   II. Networking and Internet.
       • Network Safety concerns.
       • Network Security tools and services.
       • Cyber Security.
       • Safe practices on Social networking.
   III. Office automation tools:
       • Spreadsheet.
       • Word processing.
       • Presentation.
   IV. Multi Media Design: (Open Source Design Tools)

- Interface and Drawing Tools in GIMP.
- Applying Filters.
- Creating and handling multiple layers.
- Using Stamping and Smudging tools.
- Importing pictures.
V. Troubleshooting: Hardware, Software and Networking.
  - Commonly encountered problems.
  - (Monitor: No display, KB/Mouse not responding, monitor giving beeps, printer not responding, check for virus, Delete temporary files if system is slow, adjust mouse speed).
VI. Work Integrated Learning IT – ISM
  - Identification of Work Areas.
  - Work Experience.

(4.GV.03) Web Applications

I. **Movie Editing Tools**.
   - Familiarization of interface components.
   - Importing pictures.
   - Importing Audio and Video Files.
   - Splitting and Joining Movie Clips.
   - Adding Titles and publishing.
II. **Customizing and Embedding Multimedia components in Web Pages.**
   - Compatible Multimedia file formats for Web Pages.
   - Embedding Audio file.
   - Embedding Video file.
   - Embedding Flash file.
III. **Web Scripting – Java Script.**
   - Java Script review.
   - Functions – user defined.
   - String Object.
   - Math Object.
   - Array Object.
   - Events.
   - Case Studies.
IV. **Work Integrated Learning IT – WA-II.**
   - Advanced Features of Web Design.
   - Code view, Add-ins / Snippets and Page Transitions.
   - Dynamic Web templates.
   - SEO - Search Engine Optimization.
   - Forms - Advanced.
   - Publishing webpages or websites-I.
   - Publishing webpages or websites-II.
   - Authoring tools.
   - CSS templates.

(4.GE.01) Language - II

Module – 3: Listening and speaking skills

In this module the learners will be exposed to a variety of listening activities recorded on audiotapes. These will be samples of good spoken English, which the learners can use as models. Work sheets will accompany the listening material.
This module will include the following:
1. Introducing yourself/friends in formal and informal situations.
2. Inviting people (over the phone and face to face) giving details of occasion, time place and date. Acceptance and refusal of invitation – formal and informal.
3. Seeking and supplying information (example opening an account in a bank, applying for loans etc.)
4. Talking and conveying messages (over the phone and face to face).
5. Giving directions / instruction.
6. Discussing contemporary issues related to environment, child labour, gender bias etc.
7. Listening to excepts form television and radio.
8. Listening to poems/plays (prescribed).
9. Listening to speeches / talks.
10. Listening to songs like "We shall overcome".

Module – 4 to 6
(English for specific purposes) (opt any one)

There modules are being offered. A learner has to opt for any one. The first is for academic purposes and the next two are for vocational purposes. The focus is not on the teaching of the subject matter like science and literature but on the way in which language is used in the deferent subjects.

Module 4: English for Science
This course will introduce learners to some interesting pieces of popular science

1. Health and hygiene
2. Conservation of (nearly extinct) animals.
3. Plant life.
4. Bio gas / solar energy.
These pieces illustrate the use of English in scientific writing: giving information factually, logically and objectively.

Module 4: English for Receptionist

This module will introduce the learners to a variety of exercises, tasks and meaningful activities related to the receptionist's use of English. The printed course materials will be supported by tapes.
The following competencies be developed:
1. Receiving messages, making request etc.
2. Supplying information
3. Giving advice and making suggestions
4. Dealing with complaints

5. Making entries in an appointment book, register etc.

Module 4: English for Office Use

This course will help the learner to use English effectively and appropriately in the office environment. The competencies will be developed.
1. Using the telephone taking and passing messages.
2. Receiving messages
3. Marking noting on files and circular.
4. Writing office notes, memos, notices, agendas for meetings.
5. Telegrams and fax messages.
6. Writing business letters, application enquires, complaints.
7. Filling in forms, cheques, pay in slips etc.

(4.VP.01) IT Tools Lab (Advanced)

- Study of computer components, Booting of Computer and its shutdown
- Practicing some fundamental DOS Commands
- Simple Programs in BASIC to compute Mean, Variance, Correlation and Regression
- Creating database in MS-Access, structuring with different types of fields and use of query facility for accessing the information

(4.VP.02) Web Applications Lab

1. Programs / Practical Questions:
   - Movie Editing Tools
   - Customizing and Embedding, Multimedia Components in Web Pages
   - Web Scripting - Java Script
2. Project / Practical File
3. Viva Voce

Level 4 (Semester II)

(4.GV.04) Database Management Systems

I.   Database Concepts – RDBMS Tool.
- Basics of RDBMS.
- SQL – Creating and Opening Database.
- Creating and populating tables.
- Modifying the content and structure of table.
- Ordering and Grouping.
- Operating with multiple tables.

II.   Operating Web Based Applications.
- Online Reservation Systems.
- E-Governance.
- Online Shopping and Bill payments.
- Online Tutorials and Tests.
- Project Management – Web Based Application development.
- Project essentials and tips.
- Case Study - Online Game.
- Case Study - Online Quiz.
- Case Study – Online Bill Calculator.

III.   Fundamentals of Java programming, Introduction to Java, Object Oriented Programming, Java Language Elements, Operators, Control Flow, Array, Class Design, Exception Handling, Assertions, Threads, Wrapper Classes, String Manipulation.

IV.   Work Integrated Learning IT – DMA.
- Identification of Work Areas.
- Work Experience.

(4.GV.05) Digital Electronics

1. **Number Systems and Boolean Algebra**
- Basics of Analog and Digital.
- Boolean algebra, De-morgan's law, Truth tables.

2. **Logical Circuits**
- Logic gates: AND, OR, NOT, NOR, NAND, XOR, XNOR.
- Combinational Circuits:
  (i)   Arithmetic Circuits: Half adders, Full adders , Subtractors,
  (ii)   Data Processing Circuits: Encoders, Decoders, Multiplexers, De-Multiplexers,

3.Latches and Flip-Flops
- Concept of Latches, Types of Latches, SR latch.
- SR Flip Flop, JK Flip Flop, D Flip flop, T Flip Flop, Flip Flop.
- Introduction to counters, Types of counters Asynchronous and Synchronous.
- Introduction to shift registers, types of shift registers,

4.   Introduction to Display Devices
- LED, LCD, 7 segment display

5. Integrated Circuits and Memories
- Introduction to IC's, Importance and applications, Linear and Digital IC's.
- Introduction to SSI, MSI, LSI and VLSI (Terminology & Definitions).
- Memory Organisation and Operations, RAM, ROM.

(4.GV.06) Computer Networks

UNIT-I
Introduction to computer Network - Communication: An Essential Part of Our Lives, Communicating in a Network-Centric World, Network as a Platform, Architecture of the Internet, Trends in Networking

Communicating over the Network - Platform for Communications, LANs, WANs, and Internetworks, Protocols, Using Layered Models, Network Addressing

UNIT-II
Application Layer Functionality and Protocols - Applications: The Interface Between the Networks, Making Provisions for Applications and Services, Application Layer Protocols and Services Examples

OSI Transport Layer - Roles of the Transport Layer, IPv4 Addresses, TCP: Communicating with Reliability, UDP: Communicating with Low Overhead

UNIT-III
OSI Network Layer - IPv4, Networks: Dividing Hosts into Groups, Routing, How Data Packets Are Handled, Routing Processes

Addressing the Network- IPv4 Addresses for Different Purposes, Assigning Addresses, Calculating Addresses, Testing the Network Layer

OSI Data Link Layer - Data Link Layer, MAC Techniques, MAC Addressing and Framing Data

(4.GV.07) Maintenance of Computer Systems

UNIT-I
OSI Physical Layer - Physical Layer, Communication Signals, Physical Signaling and Encoding: Representing Bits, Physical Media: Connecting Communication

Ethernet - Overview of Ethernet, Ethernet: Communication through the LAN, Ethernet Frame Ethernet MAC, Ethernet Physical Layer, Hubs and Switches, Address Resolution Protocol (ARP)

UNIT-II
Planning and Cabling Networks - LANs: Making the Physical Connection, Device Interconnections, developing an Addressing Scheme, Calculating the Subnets, Device Interconnections

Configuring and Testing Your Network - Configuring Devices, applying a Basic Configuration, Verifying Connectivity, Monitoring and Documenting Networks

(4.GP.03) Database Management Systems Lab

1. Programs / Practical Questions
   - SQL Queries
   - JAVA Programs
   - Operating Web Based Application
2. Project / Practical File
3. Viva Voce

(4.GP.04) Maintenance of Computer Systems and Computer Network Lab

- Identifying external ports and interfacing
- Identifying PC cards and interfacing
- Identifying ports on the cards and interfacing
- Preventive maintenance of a PC
- Understanding CMOS
- Partitioning and formatting Hard disks.
- Working with Antivirus software's

Level 5 (Semester I)

(5.GV.01) IT Foundations & Programming Concepts

Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet; Hardware & Software; Von Neumann model.

Hardware: CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD/DVD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen Voice Input, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD, LED; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Software: System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases; Application software: Generic Features of Word processors, Spread sheets and Presentation software; Generic Introduction to Latex for scientific typesetting; Utilities and their use; Computer Viruses & Protection, Free software, open source.

Computer Networks and Internet: Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line Wireless and Wi-Fi connectivity ; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, Web pages, Web Programming Languages.

Information Technology And Society: Indian IT Act, Intellectual Property Rights, issues. Application of information Technology in Railways, Airlines, Banking, Insurance, Inventory Control, Financial systems, Hotel management, Education, Video games, Telephone exchanges, Mobile phones, Information kiosks, special effects in Movies.

Programming Concepts & Techniques: Program Concept, Characteristics of Programme, Stages in Program Development, Tips for Program Designing, Programming Aids, Algorithms, Pseudo code, Notations, Design, Flowcharts, Symbols, Rules, compiler & Interpreter. Introduction to programming techniques, Top-down & Bottom-up approach, Unstructured, & Modular programming, Cohesion, Coupling, Debugging, Syntax & Logical Errors, Linking and Loading, Testing and Debugging, Documentation.

(5.GV.02) Web Designing

UNIT-I
Introduction to HTTP, HTML, Basic HTML Tags, Body Tags, Coding Style, Modifying & formatting Text, Lists – Unordered, Ordered, Definition, Insert Links -Linking to another Document, Internal Links, Email Links, Relative and Absolute Links, Insert Images - Referencing Images, Clickable Images, Image Placement and Alignment, Image Size, Image

Margins, Image Formats, Image Maps- Defining an Image Map, Advanced Coloring Body Content, Working with tables - Basic Tables, Table Attributes, Table Cell Attributes, Table Row Attributes, Tables Inside of Tables, Invisible Spacers, Working with Frame-Based Pages-Creating Windows, Single Window Frames, Creating Column Frames, Creating Row Frames, Creating Complex Frames.

UNIT-II
Cascading Style Sheet (CSS) – Introduction, creating style, using inline and external CSS, Creating Divs with ID style, Creating Tag& Class style, creating borders, Navigation links, creating effects with CSS.
JavaScript – Introduction, use of JavaScript in webpages. Understand JavaScript event model, use some basic event and control webpage behavior.

UNIT-III
DESIGNING WEBSITES WITH DREAMWEAVER/EXPRESSION Web/AMAYA/COFEE CUP WYSIWYG HTML Editor - Introduction to WYSIWYG HTML editor, advantages of using HTML editors, Creating a New Site, Creating a New Page, Adding Images with Alternate Text, Inserting & Formatting Text, Aligning Images, Creating an Email Link, Linking to Other Websites, Testing & Targeting Links, Organizing Files & Folders
CREATING & INSERTING IMAGES - Optimizing Images for the Web, Saving GIFs & PNGs in Photoshop, Inserting GIFs, Adjusting Transparency Settings, Saving JPGs for the Web

UNIT-IV
DESIGNING ACCESSIBLE TABLES - Understanding Tables & Accessibility, Using Tables for Tabular Data, styling a Table, Editing Table Layouts, Adding Style to a Table Using CSS
CREATING WEBSITES WITH FRAMES - Introducing Frames, creating a Frameset, Opening Pages into Frames, Controlling Scrollbars & Borders, Targeting Links in Frames
CUSTOMIZING THE INTERFACE - Opening an Existing Site, Reviewing Menu Options & Preferences, Comparing the Macintosh & PC Interfaces, Previewing in Browsers & Device Central
Introduction to Responsive Web Designing – Introduction, advantages, creating and using responsive web pages.

UNIT-V
Web Hosting - What is Domain? Introduction to DNS, how to register a Domain? What is web hosting? How to get a web hosting? Host your website on web Server. FTP - FTP Introduction, FTP Commands Viewing Files and Directories, FTP Commands Transfer and Rename files, FTP with WS FTP/ CuteFTP, Filezilla on Windows.

(5.GV.03) Programming in C

Introduction to 'C' Language - Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic operators and Expressions, Constants and Literals, Simple assignment statement, Basic input/output statement, Simple 'C' programs.

Conditional Statements and Loops - Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming.

Arrays - One dimensional arrays: Array manipulation; Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in an array; Two dimensional

arrays, Addition/Multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, Standard library string functions

Functions - Top-down approach of problem solving, Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments.

Storage Classes - Scope and extent, Storage Classes in a single source file: auto, extern and static, register, Storage Classes in a multiple source files: extern and static

Structures and Unions - Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays, unions

Pointers - Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays, pointers and structures, dynamic memory allocation.

File Processing - Concept of Files, File opening in various modes and closing of a file, reading from a file, writing onto a file

(5.GV.04) Operating System (OS)

- **System Software:** Operating System, Compiler, Interpreter and Assembler;
- **Operating System:** Need for Operating System, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of Operating System-Interactive (GUI based), Time Sharing, Real Time and Distributed, commonly used Operating System: UNIX, LINUX, Windows, Solaris, BOSS (Bharat Operating System Solutions); Mobile OS – Android, Symbian, IOS.
- **Utility Software:** Anti-Virus, File Management tools, Compression tools and Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup).

(5.VP.01) Web Designing Lab

- generic awareness about Hyper Text Markup Language (HTML).
- designing of websites.
- basics of HTML tags.
- Cascading Style Sheet (CSS).
- functional knowledge of web hosting

(5.VP.02) C Programming Lab

Programming Fundamentals
- Data Types: Concept of data types; Built-in data types - byte, short, int, long, float, double, char, string, boolean

- Variables: Need to use variable, declaring variables, variable naming convention, assigning value to variables;
- Integer object method: parseInt
- Double object method: parseDouble, parseFloat
- Control Structures: Decision Structure – if, if-else, switch; Looping Structure- while, do . . while, for;

Programming Guidelines:
- General Concepts; Modular approach;
- Stylistic Guidelines: Clarity and simplicity of expressions and names; Comments, Indentation;
- Running and debugging programs, Syntax Errors, Run-Time Errors, Logical Errors;
- Problem Solving Methodology: Understanding of the problem, identifying minimum number of inputs required for output, breaking down problem into simple logical steps.

Level 5 (Semester II)

(5.GV.05) Data Structure

UNIT–I

An Overview of Computers and Programming - Simple program logic, The steps involved in the program development cycle, Pseudo code statements and flowchart symbols, Using a sentinel value to end a program, Programming and user environments, The evolution of programming models.

UNIT–II

The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of List Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application: Infix, post fix, Prefix and Recursion, Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue

UNIT–III

Introduction to the Linked List of Stacks, Basic operations on linked list, Stacks and queues as a circular linked list, Header nodes, Doubly Linked List, Circular Linked List, Stacks & Queues as a Circular Linked List, Application of Linked List.

UNIT–IV

TREES - Basic Terminology, Binary Trees, Tree Representations as Array & Linked List, Basic operation on Binary tree, Traversal of binary trees: - In order, Preorder & post order, Application of Binary tree, threaded binary tree, B-tree & Height balanced tree, B+ & B* trees, 2-3 trees, Binary tree representation of trees, Counting binary trees

UNIT–V

Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Comparison of sorting methods

Hash Table, Collision resolution Techniques, Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, Shortest path algorithm

(5.GV.06) Concepts of Data Mining

Unit-I

Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses: -Star Schema, Snowflake Schema, Fact Constellations, Multidimensional Data Model & Aggregates.

Unit-II

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers: -ROLAP, MOLAP, HOLAP Queries.

UNIT-III

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data

Mining System categorization and its Issues. Data Processing:- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

Unit-IV

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP), Dynamic Item set Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth), Performance Evaluation of Algorithms,

Unit-V

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method.

Cluster Analysis: - Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods: - Partitioned Methods, Hierarchical Methods, Density- Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

(5.GV.07) Object Oriented Programming with JAVA

UNIT–I

C++ vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment.

JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting.

Operators: Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation.

If statement, if…else… statement, Nesting of if…else… statements, else…if Ladder, Switch, ? operators, Loops – While, Do, For, Jumps in Loops, Labelled Loops.

UNIT–II

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods.

Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

UNIT–III

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Packages, Hiding Classes.

UNIT–IV

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

UNIT–V

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

(5.GV.08) MULTIMEDIA – TOOLS & APPLICATIONS

UNIT -I
Introduction To Multimedia, Needs and Areas of use, Identifying Multimedia Elements - Text, Images, Sound, Animation and Video, Making Simple Multimedia With PowerPoint.
TEXT - Concepts of Plain & Formatted Text, RTF & HTML Texts, Using Common Text Preparation Tools, Conversion to and from of Various Text Formats, Creating text using standard software.

UNIT-II
SOUND - Sound and its Attributes, Sound and Its Effects in Multimedia, Frequency, Sound Depth, Channels and its Effects on Quality and Storage, Size Estimation of Space of a Sound File, Sound Card Standard – FM Synthesis Cards, Waves Table Cards, MIDI and MP3 Files and Devices, 3D Sounds, Recording and editing sound using sound editors like Audacity, Sound forge etc.

UNIT-III
IMAGES - Importance of Images Graphics in Multimedia, Vector and Raster Graphics, Regular Graphics vs. Interlaced Graphics, Image Capturing Methods - Scanner, Digital Camera Etc. Color models-RGB, CYMK, Hue, Saturation, and Brightness, Various Attributes of Images Size, Color, Depth Etc, Various Image File Format BMP, DIB, CIF, PIC, and TIF Format Their Features And Limitations, Image format conversion, various effects on images. Create images using Photoshop, CorelDraw and apply various effects, Using Layers, Channels and Masks in images.

UNIT-IV
VIDEO- Basic of Video, Analog and Digital Video Type of Video, Digitization of Analog Video, Video Standard – NTSC, Pal, HDTV, Video Capturing Media /Instruments Videodisk Camcorder Compression Techniques, File Formats AVI, MJPG, MPEG, Video Editing and Movie Making Tools, converting formats of videos, recording and editing videos using video editing software like adobe premiere or Sony Vegas.

UNIT-V
ANIMATION- Concepts of animation, 2D and 3D animation, tools for creating animation, character and text animation, creating simple animation using GIF animator and flash, Morphing and Applications.
Authoring tools for Multimedia – Introduction to various types of multimedia authoring tools, CD/DVD based and web based tools, features and limitations, creating multimedia package using all components.

(5.VP.03) Data Structure Lab

- Implement stack. Write functions like push, pop, Initialize, Empty or Full.
- Implement concept of queues
- Implement queues in a circular array.
- Implement queues as a circular linked list
- Implementing doubly linked list
- Binary search tree to sort an array

(5.VP.04) Java Lab

Programming problems based on all concepts covered in theory such as Arrays, Classes, Threads, Methods, Applets etc.

Level 6 (Semester I)

(6.GV.01) Linux Operating System - Operations & Management

UNIT – I

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell.

Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories, Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, more, less, creating and viewing files, using cat, file comparisons, View files, disk related commands, checking disk free spaces.

Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down.

UNIT–II

Essential Linux commands Understanding shells, Processes in Linux process fundamentals, connecting processes with pipes, redirecting input output, manual help, Background processing, managing multiple processes, changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep, Printing commands, grape, fgrep, find, sort, Cal, banner, touch, file, file related commands-ws, sat, cut, grep, dd, etc.

Mathematical commands- bc, expr, factor, units.

vi, joe, vim editor

UNIT–III

Shell programming Basic of shell programming, Various types of shell, shell programming in bash, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, shell keywords, Creating Shell programs for automate system tasks and report printing, use of grep in shell, awk programming.

UNIT–IV

System administration Common administrative tasks, identifying administrative files – configuratinn and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su.Getting system information - host name, disk partitions & sizes, users, kernel.

Backup and restore files, linuxconf. utility in GUI, reconfiguration hardware with kudzu Configure desktop-X configurator, understanding XF86config file, starting & using X desktop. KDE & Gnome graphical interfaces, changing X settings.

UNIT–V

Basic networking administration Setting up a LAN using Linux, choosing peer to peer vs client/server model, setting up an Ethernet Lan, configuring host computers, checking Ethernet connecting, connecting to internet, administration in a networked environment, common networking administrative tasks, the network file system, configuring Ethernet, initializing Ethernet Interface, ifconfig, netstat and netconfig commands a TCP/IP networks, DNS services, routing using Linux, SLIP & PPP services, UUCP.

Installation & Administration of mail server, ftp server and Apache web server.

(6.GV.02) Software Engineering

UNIT - I

SOFTWARE **:** Software Characteristics, Components & Applications, Software Engineering - A Layered Technology, Software Process Models - Linear Sequential Model, Prototype & Rad Model., Evolutionary Software Process Model – Incremental Model and Spiral Model.

SOFTWARE PROJECT MANAGEMENT: Project Management Concepts – People Problem and Process S/W process and Project Metrics : Metrics in The Process and Project Domains . Software Measurement –Size Oriented, Function Oriented Metrics, Extended Function

UNIT - II
SOFTWARE PROJECT PLANNING: Objectives, Scope, Project Estimation, Decomposition Techniques, Empirical Estimation Models.
ANALYSIS CONCEPT AND PRINCIPLES: Requirement Analysis, Communication Techniques, Analysis Principles, Software Prototyping, Specifications.
ANALYSIS MODELING: Elements of The Analysis Modeling, Data Modeling. Functional Modeling and Information Flow, Behavioral Modeling, Data Dictionary.

UNIT – III
DESIGN CONCEPTS AND PRINCIPLES: Design Process, Design Concepts, Design Principles, Effective Modular Design .
DESIGN METHODS : Architectural Design Process, Transform Mapping and Transaction Mapping, Interface Design, - Internal and External Design, Human Computer Interface Design, Interface Design Guidelines, Procedural Design.

UNIT - IV
S/W Quality Assurance : Quality Concepts, Matrix for Software Quality, Quality Movement, S/W Q A, S/W Review, Formal Technical Reviews, Formal Approaches to SQA, S/W Reliability, ISO 9000 quality Standards
S/W TESTING MODELS : S/W Testing Fundamentals, Test Case Design, White and Black Box Testing, Basic Path Testing, Control Structure
S/W TESTING STRATEGIES : Strategic Approach To S/W Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging

UNIT - V
S/W REUSE : Reuse Process, Building Reuse Components, Classified And Retrieving Components, Economics Of S/W Reuse
COMPUTER AIDED S/W ENGINEERING: Introducing of Case, Building Block For Case, Taxonomy Of Case Tools, Integrating Case Environment, Integrating Architecture, Case Repository.

(6.GV.03) Web Development using PHP
UNIT I
Introduction to PHP as a programming Language: - Advantages of PHP, the server side architecture Decomposed, overview of PHP, history, object oriented support, benefits in running PHP as a server side script. Installing a web server, Internet information server, and IIS installation, testing web server setup.
UNIT II
The basics of PHP: - data types, variables, constants, operators, Arrays, Conditional statements (if statement, Executing Multiple Statements, else if clause and switch statement), Iterations (for loop, while loop, controlling an array using a while loop, do while statement, for each loop and special loop key words)
UNIT III
Functions, user defined functions, functions with arguments, built in functions (print(), includer(), header(), phpinfo()), PHP server Variables, working with date and time , performing mathematical operations , working with string functions . System Variable (GET, POST, cookies& Session, Forums)
UNIT IV
Working with forms, form elements (Text Box, Text Area, Password, Radio Button, Checkbox, The Combo Box, Hidden Field and image), adding elements to a form, uploading files to the

Web Server using PHP, building a challenge and response subsystem and understanding the functionality of the FORM attribute Method Regular Expressions: - Engine, types of Regular Expressions, symbols used in Regular Expressions. Error handling in PHP: - Displaying errors, warnings, types of errors, error levels in PHP, logging Errors and Ignoring errors.

UNIT V

Data base connectivity using PHP (MySQL, ODBC, ORACLE, SQL) Performing, executing Commands, different types of Data Base Operations like Insertion, deletion, update and query on data

(6.GV.04) Window Development Fundamentals

- Programming web applications
- Working with data and services
- Troubleshooting and debugging web applications
- Working with client-side scripting
- Configuring and deploying web applications
- Understanding core programming
- Understanding object-oriented programming
- Understanding general software development
- Understanding web applications
- Understanding desktop applications
- Understanding databases

(6.VP.01) Web Development using PHP Lab

PHP programming language and 2D, 3D animation based on the theory covered in class.

(6.VP.02) Window Development Fundamentals Lab

- Client-side scripting Programs
- Deploying web applications
- Basic object-oriented programs
- Understanding desktop applications
- Basic SQL Queries

Level 6 (Semester II)

(6.GV.05) Software Testing & Project Management

UNIT - I
Testing basics and Development Models: Principals and context of testing in software production, Usability and Accessibility Testing, Phases of Software Project, Process models to represents different phases, Software Quality Control and its relation with testing, validating and verification, Software Development life cycle models, various development models.
White Box Testing: White Box Testing - Static Testing, Structural Testing-Unit code functional testing, Code coverage testing, code complexity testing,
Black Box Testing- What? Why and when to do Black box testing, Requirements based testing, Positive and Negative Testing, Boundary value testing, Decision Tables, Equivalence Partitioning, State Based or Graph Based Testing, Compatibility Testing, User Documentation Testing, Domain Testing.

UNIT - II
Integration Testing: Introduction and types of integration testing, Scenario testing, defect bash.
System and Acceptance Testing- Overview, functional and non-functional testing, Acceptance testing.
Overview of some software testing tools: WinRunner, LoadRunner, Test Director.
(Some practical should be conducted using these tools)

UNIT- III
Performance Testing- Introduction, factors related to performance testing, methodology for performing testing, Regression Testing,
Ad hoc Testing- Overview, Buddy & pair testing, Exploratory testing, Interactive testing, Agile and extreme testing.
Testing of Object Oriented Testing – Introduction, Differences in OO testing.

UNIT – IV
Software Project Management: Overview, Software Project Management Framework, Software Development life cycle,
Organization Issues and Project Management, Managing Processes, Project Execution, Problems in Software Projects, Project Management Myths and its clarifications.
Software Project Scope: Need to scope a software project, scope management process, communication techniques and tools, communication methodology
Software Requirement Gathering and Resource allocation: Requirement specifications, SRS Document preparation, Resources types for a software projects, requirement for resources allocation.

UNIT – V
Software Project Estimation: Work Breakdown structure (WBS), steps in WBS, Measuring efforts for a project, techniques for estimation – SLOC, FP, COCOMO and Delphi methods.
Project Scheduling: Scheduling and its need, scheduling basics, Gannt Chart, Network scheduling techniques, Pert and CPM
Using a Project Management Tool: Introduction to MS Project 2000, Managing tasks in MS Project 2000, Tracing a project plan, creating and displaying project information reports.

(6.GV.06) Android Application Development

UNIT-I
Android Introduction, Smartphones future, Preparing the Environment, Installing the SDK, Creating Android Emulator, Installing and Using Eclipse, Installing Android Development Tools, Choosing which Android version to use

Android Architecture, Android Stack, Android applications structure
Creating a project, Working with the AndroidManifest.xml, Using the log system Activities
Introduction to UI – Layouts, Fragments, Adapters, Action bar, Dialogs, Notifications, UI best practices
UI Architecture, Application context, Intents, Activity life cycle, Supporting multiple screen sizes

Unit - II
Designing User Interface Using Views – Basic Views- TextView, Button, ImageButton, CheckBox,ToggleButton, RadioButton etc., ProgressBar View and AutoCompleteTextView, TimePicker and DatePicker View, ListView,
IMageView, ImageSwitcher and GridView, DigitalClock & AnalogClock Views
Notification and Toast, Parameters , on Intents, Pending intents, Status bar notifications
Toast notifications

UNIT-III
Menus, Localization, Options menu, Context menu
Dialogs-Alert dialog, Custom dialog, Dialog as Activity
Orientation and Movement- Pitch, roll and yaw, Natural device orientation, Reference frame remapping
SMS - Sending and Receiving
Working with Media –Playing audio and video, Recording audio and video

UNIT-IV
Location and Maps - Google maps, Using GPS to find current location
Working with data storage - Shared preferences, Preferences activity, Files access, Using External storage, SQLite database
Animation-View animation, Drawable animation
Working with Sensors- Finding sensors, Accelerometers, Gyroscopes, Other types
Working with Camera – Controlling the camera, Preview and overlays, Taking pictures

UNIT-V
Content providers- Content provider introduction, Query providers
Network Communication - Web Services, HTTP Client, XML and JSON, Using e-mails.
Services - Service lifecycle, Foreground service, Creating own services
Publishing and Distributing Your App -Preparing for publishing, Google Play requirements,
Signing and preparing the graphics, Publishing to the Android Market, Monetization, Tips on becoming a top app, Google analytics

(6.GV.07) Windows Configuration and Server Administration

Understanding Windows Programming Basics: Identify Windows application types, Implement user interface design.
Creating Windows Forms Applications: Create and handle events, Understand Windows Forms inheritance, understand how to create new controls and extend existing controls, Validate and implement user input, Debug a Windows-based application.
Creating Windows Services Applications: Create a Windows Services application, Install a Windows Services application.
Accessing Data in a Windows Forms Application: Understand data access methods for a Windows Application, Understand data bound controls.
Deploying a Windows Application: Understand windows application deployment methods, integrating data.
Network basics: Type of Networks, Topologies, Transmission media, Install UTP(Straight, Cross, Rollover Cables), IP Addressing, Subneting, OSI Model, TCP/IP Model, Wireless Network, Network Devices.
Installation: Installation Server, Drivers, Working with windows server Devices, Troubleshooting Devices & Drivers, Managing system updates.

Working With Disk Storage: Type of Disk Storage, Type of volumes, Implementing fault tolerance, Use disk management tools, Disk Quota, Troubleshooting disk management, Shadow copy.
Domain Controller: Install Active Directory, Manage Active Directory Component, Working with OU Structure, Working with Domain User account, Working with Domain Groups, Troubleshooting Active Directory.
Domain Name Services (DNS): Define Name resolution, Install DNS, Configure DNS Client, Manage and Troubleshoot DNS.
Dynamic Host Configuration Protocol: Configure DNS Server, Working With Super Scope, Configure DHCP Client, Manage and Troubleshoot DHCP Server.
Backup and Restore: Requirement for Backup and Recovery AD, Issue for AD Backup and Recovery, Steps for Backup and Recovery AD.

(6.GV.08) Management Information System

Unit I
An introduction to information systems, Information systems in organizations, Information Technology Concepts, The IS Revolution; Information requirement for the different levels lf management, transaction processing system, Management information 34 system, Decision support system. Strategic Role of Information Systems. Business Processes; Information management, and Decision Making. Computers and Information Processing;

Unit II
Transaction processing system; hardware and software requirements, tools used, case studies, merits and demerits of transaction processing system.

Unit III
Managerial control, Information and tools required, difference between transactional system and managerial system. Frequency of taking outputs, Need for interconnected system, common database, Redundancy control, case studies. Decision support system, concept and tools, case studies, virtual organizations, strategic decisions-unstructured approach, cost and values of unstructured information.

Unit IV
Optimization techniques, difference between optimization tools and DSS tools expert system, difference between expert system and management information system. Role of chief Information officer.

(6.VP.03) Android Application Development Lab

1. Write a simple Application which will print "Hello World!"
2. Write a simple Application that uses UI Layout and Control.
3. Write a simple Application that makes use of Style & Themes.
4. Write a simple Application that uses Event Handling.
5. Write a simple Application that uses Alarm, Notification.
6. Make a location based app.
7. Write a program that shows the use animation.
8. Write a program that shows the use of Image Effects.
9. Write a program that shows the use Image Switcher.
10. Write a program that shows the use of database.

(6.VP.04) MIS Lab

Experiments to be covered based on the theory covered in class

Level 7 (Semester I)

(7.GV.01) Technology Trends in IT

Unit-I
Internet of Things (IoT) – Definition of IoT, History of IoT, IoT vs. similar concepts, Application/Segment overview, Technology overview

Unit-II
Big Data Analytics: Concepts, examples of big data analytics, benefits of big data analytics, Technologies, and Applications, requirements for being successful with big data analytics

Unit-III
Cloud Computing – Introduction, Why cloud services are popular, advantages, Characteristics, Service models, Deployment of cloud services, Potential privacy risks

Unit-IV
Cyber Security – Introduction, risks, Malicious code, Hacker, attacker or intruder, Cyber security Principles, Information Security (IS) within Lifecycle Management, Risks & Vulnerabilities, Incident Response, Future Implications & Evolving Technologies

Unit-V
Wearable Technologies – Introduction, Applications of Wearable Technology, Challenges to Wearable Technology, various Wearable devices.

(7.GV.02) Windows Mobile Application Development

Unit-I

INTRODUCTION TO WINDOWS 8 APPLICATION DEVELOPMENT - brief history of windows application development, History of APIs and Tools, Operating System Input Methods
The Windows Charm Bar, Start Button, Search Button, Share Button, Devices Button, Settings Button, Windows Desktop, Switching between Desktop Programs

WINDOWS 8 ARCHITECTURE FROM A DEVELOPER'S POINT OF VIEW - Windows 8 Development Architecture, Desktop Application Layers, Understanding Windows Runtime: Windows Runtime Architecture Overview, Metadata in Windows Runtime, .NET Framework 4.5: The Installation Model of .NET Framework 4.5, Window Runtime Integration, Picking the Appropriate Technology for Your Project, Choosing a Programming Language

GETTING TO KNOW DEVELOPMENT ENVIRONMENT - Introducing the Toolset, Visual Studio IDE: Creating a New Project, Lighting Up Your Applications with Expression Blend

UNIT-II

PRINCIPLES OF MODERN WINDOWS APPLICATION DEVELOPMENT - Windows 8 Style Application, Windows 8 Design Language, Introduction to Asynchronous Programming, Evolution of Asynchronous, Programming on the .NET Platform

CREATING WINDOWS 8 STYLE APPLICATIONS WITH HTML5, CSS, AND JAVASCRIPT - HTML5 and CSS on the Web, HTML5 Technologies, HTML5 Applications on Windows Runtime, The Windows Library for JavaScript (WinJS), Creating Windows 8 Style Applications with JavaScript, Accessing the Filesystem, Managing Data, Respecting the User's Device

UNIT-III
USING XAML TO CREATE WINDOWS 8 STYLE USER INTERFACES - Describing the User Interface Using XAML, Using Namespaces, Understanding the Layout Management System, Reusable Resources in XAML, Basic Controls in Windows 8 Style Applications: Controls with Simply Accessing the Internet: e Values, Content Controls, Working with Data: Data Binding Dependency Properties and Notifications, Binding Modes and Directions

WORKING WITH XAML CONTROLS - Using Animations in Application, Designing the Visual Look of a Control, Working with Complex Controls: Getting to Know the ListViewBase Controls, Using the Grid View Control, Binding to Data, Grouping Data, Defining Visual Groups

BUILDING WINDOWS 8 STYLE APPLICATIONS - The Lifecycle of a Windows 8 Application, Deploying Windows 8 Apps, Commanding Surfaces, Persisting Application Data, Applications and the Start Screen

UNIT-IV
CREATING MULTI-PAGE APPLICATIONS - Navigation Basics, working with Pages, Using the Split Application and Grid Application Templates

BUILDING CONNECTED APPLICATIONS - Integrating with the Operating System and Other Apps: Picker Unified Design to Access Data, Understanding the Concept of Contracts, Accessing the Internet: Detecting the Changes of Internet Connectivity, Using Feeds, Accessing Windows Live
LEVERAGING TABLET FEATURES - Accommodating Tablet Devices, Building Location-Aware Applications, Using Sensors: Using Raw Sensor Data, Using Sensor Fusion Data

UNIT-V
ADVANCED PROGRAMMING CONCEPTS - Building Solutions with Multiple Languages: Hybrid Solutions, Background Tasks: Understanding Background Tasks, How Background Tasks Work, Cancelling Background Tasks, Implementing Background Tasks, creating a Simple Background Task, Managing Task Progress and Cancelation, Input Devices

TESTING AND DEBUGGING WINDOWS 8 APPLICATIONS - The Quality of Software, Becoming Familiar with Debugging, Controlling the Program Flow in Debug Mode, Monitoring and Editing Variables, Changing the Code While Debugging, Windows 8 Style Application-Specific Scenarios, Introduction to Software Testing, Introduction to Unit Testing, Unit Testing Windows 8 Style Applications

INTRODUCING THE WINDOWS STORE - Getting to Know the Windows Store, How Customers See an App in the Windows Store, Application Details, Making Money with Your App, The Developer Registration Process: Submitting the Application, The Application Certification Process, The Windows App Certification Kit.

(7.GV.03) Introduction to Python Programming

- Familiarization with the basics of Python programming: a simple "hello world" program, process of writing a program, running it, and print statements; simple data-types: integer, float, string
- Introduce the notion of a variable, and methods to manipulate it (concept of L-value and R-value even if not taught explicitly)
- Knowledge of data types and operators: accepting input from the console, assignment statement, expressions, operators and their precedence.

- Conditional statements: if, if-else, if-elif-else; simple programs: e.g.: absolute value, sort numbers, and divisibility.
- Notion of iterative computation and control flow: for, while, flowcharts, decision trees and pseudo code; write a lot of programs: interest calculation, primarily testing, and factorials.
- Idea of debugging: errors and exceptions; debugging: pdb, break points.
- Lists, tuples and dictionary: finding the maximum, minimum, mean; linear search on list/tuple of numbers, and counting the frequency of elements in a list using a dictionary. Introduce the notion of accessing elements in a collection using numbers and names.
- Sorting algorithm: bubble and insertion sort; count the number of operations while sorting.
- Strings: compare, concat, substring; notion of states and transitions using state transition diagrams.

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(7.GV.04) Introduction to Microprocessors

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Digital Design and VHDL
1.1. Introduction
1.2. Combinational Logic
1.3. Structural Modeling
1.4. Sequential Logic
1.5. Finite State Machines
1.6. Parameterized Modules
1.7. Test benches

2. Arithmetic Logic Unit (ALU)
2.1. Introduction
2.2. Arithmetic Circuits
2.3. ALU
2.4. Number Systems

3. Microprocessor I: Instruction Data Set. Machine Language
3.1. Introduction
3.2. Assembly Language
3.3. Machine Language
3.4. Programming
3.5. Addressing Modes
3.6. Lights, Camera, Action: Compiling, Assembling, and Loading
3.7. Odds and Ends

4. Microprocessor II: Control and Datapath Design. Single-Cycle Processor
4.1. Introduction
4.2. Performance Analysis
4.3. Single-Cycle Processor

5. Microprocessor III: Control and Datapath Design. Multi-cycle Processor
5.1. Introduction

5.2. Performance Analysis
5.3. Multicycle Processor
5.4. Pipelined Processor

6. Memory systems and I/O.
6.1. Introduction
6.2. Memory System
6.2.1. Caches
6.2.2. Virtual Memory
6.3. Memory-Mapped I/O
6.3.1. Memory map
6.3.2. I/O Devices
6.4. Buses and organization

(7.VP.01) Windows Mobile Application Development Lab

1. Working with J2ME Features
2. Threads & High level UI
3. Developing networked applications using the wireless toolkit
4. Authentication with a webserver
5. Study Windows API's. Find out their relationship with MFC classes. Appreciate how they are helpful in finding complexities of windows programming.

(7.VP.02) Python Programming Lab

- Find the largest and smallest numbers in a list.
- Find the third largest number in a list.
- Test for primarily.
- Find whether a string is a palindrome or not.
- Given two integers x and n, compute x^n.
- Compute the greatest common divisor and the least common multiple of two integers.
- Test if a number is equal to the sum of the cubes of its digits. Find the smallest and largest such numbers

Level 7 (Semester II)

(7.GV.05) Introduction to AI

UNIT – I
Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success. Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem Heuristic search techniques : Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction

UNIT - II
Knowledge Representation: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation. Using Predicate Logic : Represent ting Simple Facts in logic, Representing instances and is-a relationship, Computable function and predicate.

UNIT - III
Natural language processing: Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing. Learning: Introduction learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from example-induction, Explanation based learning.

UNIT - IV
Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. Knowledge acquisition: General concepts in knowledge acquisition, early work in Machine Learning, examples of Inductive Learners, computer vision, Robotics, overview of LISP- AI language.

(7.GV.06) e-Commerce

Unit I
Introduction E-Business: Origin and Need of E-Commerce, Factors affecting E -Commerce, Business dimension and technological dimension of E-Commerce, E-Commerce frame work Electronic Commerce Models, Value Chains in Electronic Commerce.

Unit II
Internet and E-Business: Introduction to Internet and its application, Intranet and Extranets. World Wide Web, Internet Architectures, Internet Applications, Business Applications on Internet, E - Shopping, Electronic Data Interchange, Components of Electronic Data Interchange, Creating Web Pages using HTML.

Unit III
Technology for Online Business: Internet, IT Infrastructure, Middleware Contents, Text and Integrating E-Business Applications, Mechanism of Making Payment Through Internet, Online Payment Mechanism, Electronic Payment Systems, Payment Gateways, Visitors to Website, Tools for Promoting Website, Plastic Money, Debit Card, Credit Card, Laws Relating to Online Transactions.

Unit IV
Applications in E-commerce: E-commerce Applications in Manufacturing, Wholesale, Retail

and Service Sector.

(7.GV.07) Computer Network Security

UNIT-I
Network Concept, Benefits of Network, Network classification (PAN, LAN, MAN, WAN), Peer to Peer, Client Server architecture, Transmission media: Guided & Unguided, Network Topologies. Networking terms: DNS, URL, client server architecture, TCP/IP, FTP, HTTP, HTTPS, SMTP, Telnet OSI and TCP/IP Models: Layers and their basic functions and Protocols, Comparison of OSI and TCP/IP. Networking Devices: Hubs, Switches, Routers, Bridges, Repeaters, Gateways and Modems, ADSL.

UNIT-II
Ethernet Networking: Half and Full-Duplex Ethernet, Ethernet at the Data Link Layer, Ethernet at the Physical Layer. Switching Technologies: layer-2 switching, address learning in layer-2 switches, network loop problems in layer-2 switched networks, Spanning-Tree Protocol, LAN switch types and working with layer-2 switches, Wireless LAN

UNIT- III
Internet layer Protocol: Internet Protocol, ICMP, ARP, RARP. IP Addressing: Different classes of IP addresses, Sub-netting for an internet work, Classless Addressing. Comparative study of IPv4 & IPv6. Introduction to Router Configuration. Introduction to Virtual LAN.

UNIT- IV
Transport Layer: Functions of transport layer, Difference between working of TCP and UDP. Application Layer: Domain Name System (DNS), Remote logging, Telnet, FTP, HTTP, HTTPS. Introduction to Network Security.

(7.GV.08) Introduction to Biometrics

Unit I
Concepts - biometric recognition, biometrics, requirements for biometrics
Biometric systems, their modes and architectures
Biometric system errors and evaluation

Unit II
Overview, comparison and evaluation of various biometrics
Unimodal biometric systems, their advantages, disadvantages and limits
Multimodal biometric systems, their modes of operation, levels of fusion

Unit III
Biometric pattern recognition methods
Privacy protection and social acceptance
Biometric standardization, data formats
Design and implementation of biometric systems, applications of biometric systems, biometric databases, security of biometric systems

(7.VP.03) AI Lab

1. Study of PROLOG.
2. Write a program to solve 8-queen's problem

3. Solve any problem using depth first search.
4. Solve any problem using best first search.
5. Solve 8-puzzle problem using best first search
6. Solve Robot (traversal) problem using means End Analysis
7. Solve traveling salesman problem.

(7.VP.04) Computer Network Security Lab

1. Identification of Connectors and Cables:
   a. Connectors: BNC, RJ-45, I/O box
   b. Cables: Co-axial, twisted pair, Optical fibre.
2. Identification of various networks components
   a. NIC (network interface card)
   b. Hub, Switch, Router.
3. Execution of basic networking Commands: Netstat, IPConfig, IfConfig, Ping, Arp-a, Nbtstat-a, Netdiag, Nslookup, Traceroute, Pathping
4. Design Ethernet Cables: Cross Cable, Straight Cable, Rollover Cable.
5. Demonstration to connect two computers with/without connecting device.
6. Demonstration of File sharing & Printer sharing.
7. Study of various topologies using topology trainer
8. Detailed study of Network and Internet Settings on PC.
9. Trouble shooting of networks & Installation of network device drivers.
10. Study of Router Configuration.
11. Logging into a router, Editing and Help features and Saving Router configuration.
12. Setting the Hostname, Descriptions, IP Address, and Clock Rate on a Router.