

the Backpropagation Algorithm, Derivatives of back propagation rule. Back propagation algorithm- Convergence, Generalization.

Evaluating Hypotheses: Estimating hypotheses Accuracy, Basics of sampling theory.

UNIT-III:

Bayesian Learning: Introduction, Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief networks, EM algorithm.

Computational Learning Theory: Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces : E-Exhausting the version space, Sample Complexity for Infinite Hypothesis Spaces : Shattering a set of Instances, The Vapnik-Chervomenkis Dimension

UNIT-IV:

Instance-based Learning: Introduction, k-Nearest Neighbor Learning, Locally Weighted Regressions, Radial Basis Functions, Case –based learning.

Reinforcement Learning: Introduction, Learning Task, Q Learning.

UNIT-V:

Genetic Algorithms: Motivation, Genetic Algorithm-Representing Hypotheses, Genetic Operators, Fitness Function and Selection, An Illustrative Example, Hypothesis Space Search, Genetic programming, Models of Evolution and Learning.

Deep Learning: Convolutional neural networks, recurrent neural networks.

Learning Resources:

1. Tom Mitchell, —Machine Learning||, McGraw-Hill Science, First edition.
2. Christopher Bishop, —Pattern Recognition and Machine learning||, Springer (2006).
3. Stephen Marsland,||Machine Learning –an algorithmic perspective||, CRC Press.
4. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville, "Deep learning ", An MIT Press book in preparation (2015).
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, —An introduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. <https://www.coursera.org/learn/machine-learning>

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

OPEN ELECTIVES OFFERED IN B.E. IV SEMESTER (2023-24)

Dept	Title Open Elective-II	Code	credits
CIVIL	Disaster Management	U22OE410CE	3
ECE	Mathematical Programming for Engineers (General Pool)	U22OE410EC	3
	Introduction to Principles of Communication Engineering (Communication Engineering Stream)	U22OE440EC	3
EEE	Solar Power and Applications	U22OE410EE	3
Mech.	Design Principles of UAVs (Stream: Unmanned Aerial Vehicles)	U22OE410ME	3
	Kinematics and Dynamics of Robotics (Stream: Robotics)	U22OE420ME	3
	Optimization Methods (General Pool)	U22OE430ME	3
H&SS	Critical Thinking	U22OE430EH	3
	Technical Writing and Professional Presentations	U22OE020EH	3
Physics	Track-I: Materials Science for Engineers Synthesis and properties of materials	U22OE420PH	3
	Track-II: Semiconductor Physics and Device Applications Basic Semiconductor Devices	U22OE410PH	3
Maths	Numerical Methods	U22OE410MA	3

With effect from the Academic Year 2023-24
VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

DISASTER MANAGEMENT
(Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 3 : 0 : 0	SEE Marks:60	Course Code: U22OE410CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	Upon the completion of this course students will be able to
<ol style="list-style-type: none">1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future.2. Study the various natural and manmade disasters and apply the mitigation measures.3. Expose students to various technologies used for disaster mitigation and management.	<ol style="list-style-type: none">1. Attain knowledge on various types, stages, phases in disaster international policies and programmes with reference to the disaster reduction.2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and management System in India.3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management System in India.4. Explain the utility of geographical information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management.5. Understand the Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management.

With effect from the Academic Year 2023-24

UNIT-I: Introduction: Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India.

UNIT-II: Natural Disasters-Hydro-meteorological based disasters: Tropical cyclones, floods, drought zones-Causes, Types, effects and Mitigation measures.

UNIT-III: Natural Disasters Geographical based disasters: Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-IV: Human Induced hazards: Chemical industrial hazards, major power break downs, traffic accidents, etc.

UNIT-V: Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management: Introduction to remote sensing and GIS, its applications in disaster management.

Learning Resources:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and Local Solutions "Univerities Press, Hyderabd, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. Battacharya, T. Disaster Science and Management, Tat McGraw Hill Company, New Delhi, 2012.

The break-up of CIE: Internal Tests +Assignments + Quizzes

1 No. of Internal Tests	: 2 Max. Marks for each Internal Test	: 30
2 No. of Assignments	: 3 Max. Marks for each Assignment	: 5
3 No. of Quizzes	: 3 Max. Marks for each Quiz Test	: 5

Duration of Internal Tests : 90 Minutes

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

**Mathematical Programming for Engineers
(General Pool: Open Elective - II)**

SYLLABUS FOR B.E. IV – SEMESTER (Civil, CSE, EEE, IT, Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U22OE410EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.

MATLAB Basics: Variables and Constants – Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-, bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, ezplot.

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations

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

UNIT - V :

Solution of Ordinary differential Equations (ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Structures and Graphical user interface using app Designer: Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

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

The break-up of CIE : Internal Tests + Assignments + Quizzes

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|--------------------------|-----|-----------------------------------|------|
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Duration of Internal Tests: 90 Minutes

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

Introduction to Principles of Communication Engineering
(Communication Engineering Stream: Open Elective - II)
SYLLABUS FOR B.E. IV – SEMESTER (other branches)

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: U22OE440EC
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Distinguish analog and digital Modulation techniques used in various Communication systems.	On completion of the course, students will be able to <ol style="list-style-type: none">1. Analyze the power and transmission bandwidth of Amplitude and Frequency Modulated signals.2. Familiarize the process of reproduction of base band signal.3. Analyze various pulse analog and pulse digital Modulation Techniques.4. Understand the transmission of binary data in communication systems.5. Estimate information content in a system

UNIT - I

Amplitude Modulation: Introduction to Modulation, Need for Modulation, Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Frequency Division Multiplexing,

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, FM demodulation

Lab Activity: Generation of FM signals using MATLAB and Simulink.

UNIT - III

Signal Sampling and Analog Pulse Communication: Ideal Sampling, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation.

Digital Communication Techniques: Quantization, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, ASK FSK, BPSK

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Pearson Education.

The break-up of CIE : Internal Tests + Assignments + Quizzes

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Duration of Internal Tests: 90 Minutes

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VASAVI COLLEGE OF ENGINEERING (Autonomous)
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SOLAR POWER AND APPLICATIONS

Open Elective-II

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U22OE410EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	<ol style="list-style-type: none">1. Compare different energy resources.2. Identify and choose proper type of meter for solar radiation measurement.3. Use proper solar thermal system according to the load requirements.4. Categorize and compare photovoltaic cells.5. Apply the knowledge of solar energy.

Unit – I

Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

Unit – II

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

Unit – III

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

Unit – IV

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

The break-up of CIE : Internal Tests+Assignments+Quizzes

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- Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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DEPARTMENT OF MECHANICAL ENGINEERING

SYLLABUS FOR B.E. IV-SEMESTER Design Principles of UAVs (Open Elective-II) (Stream: Unmanned Aerial Vehicles)

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
The objective of this Course is to understand the features of fundamentals of design and parameters, aerodynamic design, performance, weight estimation and stability of UAVs	<ol style="list-style-type: none">1 Describe the design fundamentals of UAVs.2 Apply the fundamental parameters in the design of UAVs.3 Analyze the aerodynamic design of UAVs.4 Explore the design concepts for the performance of UAVs.5 Estimate the weight and stability of UAVs.

UNIT I: Design Fundamentals:

Introduction, UAV Classifications, Design Criteria, Objectives, and Priorities, Feasibility Analysis, Design Groups, Design Disciplines, Design Process: UAV Life Cycle, Systems Engineering Approach, Conceptual Design, Preliminary Design, Detail Design, Design Review, Evaluation and Feedback.

UNIT II: Fundamental parameters

Various methods to measure flight velocity: using Pitot tube and Pitot static tube, with numerical problems, Variation of Pressure, density and temperature with altitude, Standard atmosphere with numerical problems. Anatomy of Airplane: Various control surfaces for an airplane: Airfoil Nomenclature: Design steps to construct an Airfoil.

UNIT III: Aerodynamic design: Lift and drag.

Generation of Lift and drag: How lift is generated, Variation of lift with angle of attack, Sources of Drag. Aerodynamic center, Center of pressure, Various

With effect from the Academic Year 2023-24 wing planforms, Mean aerodynamic cord. Lifting line theory, NACA airfoils, Drag generation and drag polar. Difference between Airfoil and Finite wing, Numerical problems on wing planforms. Interpreting airfoil data, Lift curve slope of finite wing, Drag Polar, Numerical problems on selection of an airfoil.

UNIT IV: Design for performance: Thrust and power.

Introduction to Airplane performance, Equation of motion in parallel and perpendicular direction of motion, Steady Level flight, Thrust required for steady level flight, thrust required curve, thrust available curve for reciprocating and Jet engine, Power Required and Power available curve. Numerical problems on calculation of performance parameters, Selection of power plant. Rate of climb and Climb angle, Climb performance, Engine sizing, Power Plant selection.

UNIT V: Weight estimation and stability

Weight estimation, Common propulsion systems, Electric Propulsion, Battery Sizing, Iterative weight estimation, Wing sizing, Wing Planform selection and sizing, Case study demonstration of Flight test, Effect of variation of CG location, Static Stability, Effects of C.G. location on static stability, Longitudinal Static stability, Contribution of tail in static stability, Neutral point.

Learning Resources:

1. Andy Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.
3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
	Duration of Internal Test:	90 Minutes		

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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DEPARTMENT OF MECHANICAL ENGINEERING

SYLLABUS FOR B.E. IV-SEMESTER

Kinematics and Dynamics of Robotics (Open Elective-II) (Stream: Robotics)

Instruction :3Hours /week	SEE Marks : 60	Course Code : U22OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	<ol style="list-style-type: none">1. Analyze the kinematics of robotic systems and apply them to solve real world problems2. Apply differential kinematics and statics concepts to design and control robotic systems3. Analyze the dynamics of serial manipulators using lagrangian and Newton-Euler mechanics4. Develop motion and force control strategies for robotic systems using feedback control techniques5. Generate and analyze robot trajectories for various applications

UNIT-I

Robot Kinematics

Forward Kinematics: Forward/direct kinematic analysis of serial manipulators.

Inverse Kinematics: General properties of inverse kinematic solution. Inverse kinematics of serial RR planar manipulators.

UNIT-II

Differential Kinematics

Linear and angular velocity of links, Velocity propagation, Manipulator Jacobian for serial manipulators, Jacobian Singularities.

UNIT-III

Static Analysis: Force and moment balance, Jacobian in statics.

Dynamics of serial manipulators

Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV

Dynamics of serial manipulators

Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V

Trajectory Generation

Joint-Space Techniques: Cubic Polynomial Trajectories, Linear Segments with Parabolic Blends-without and with via points

Cartesian-Space Techniques: Straight line path, Circular Path, Position Planning, Orientation Planning.

Learning Resources:

1. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, "Robotics: Modelling, Planning and Control", Springer Science & Business Media, 2010.
2. M.W.Spong and M.Vidyasagar, "Robot Dynamics and Control", 1st Edition, John Wiley and sons, 1990.
3. R.K.Mittal and I.J.Nagrath, "Robotics and Control", Tata McGraw-Hill, 2003.
4. Subir Kumar Saha, "Introduction to Robotics", Tata McGraw-Hill Education, 2014.
5. Howie M. Choset, Seth Hutchinson, Kevin M. Lynch, "Principles of Robot Motion: Theory, Algorithms, and Implementation", MIT Press, 2005.

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DEPARTMENT OF MECHANICAL ENGINEERING

**Optimization Methods (Open Elective-II)
(General Pool)**

SYLLABUS FOR B.E. IV-SEMESTER

Instruction :3Hrs /week	SEE Marks: 60	Course Code:U22OE430ME
Credits :3	CIE Marks: 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
<p>The objectives of this course are to:</p> <p>understand Linear & non-linear programming, transportation modeling, CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)</p>	<p>On completion of the course, the student will be able to:</p> <ol style="list-style-type: none">1. Optimization of resources in multi disciplinary areas through linear programming under different conditions.2. Understand revised simplex methods per customer requirements to suit for various Organizations.3. Minimization of total cost to apply for transportation techniques for the transshipment of Goods and products and Implement techniques like project management4. Optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I

Optimization-An overview

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP- Graphical method, simplex method.

UNIT-II

Advanced topics in Linear programming

Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III

Transportation Model

Introduction to Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution- Optimization of transportation model using MODI method.

Project Scheduling

Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method, introduction to PERT.

UNIT-IV

Non linear programming problems

Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search, Dichotomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V

Non Linear - Unconstrained optimization: classification, Univariate search, pattern Directions, Hook Jeeves, Powel method, steepest decent method.

Learning Resources:

1. Singiresu S. Rao, "Engineering optimization- Theory and Practice", 4thEdition, John Wiley and Sons, 2009.
2. NVS Raju, "Optimization Methods for Engineers ", PHI Learning Pvt. Ltd., 2014.
3. Prem Kumar Gupta and Dr. DS Hira, "Operations Research ", S.Chand & Company Pvt. Ltd., 2014.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt. Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and examples, PHI Pvt. Ltd, 1st edition 2003, Delhi.

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VASAVI COLLEGE OF ENGINEERING (Autonomous)

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

CRITICAL THINKING (Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code : U22OE430EH
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none">1. Identify the core skills associated with critical thinking.2. Comprehend the various techniques of critical thinking3. Evaluate data and draw insights from it to make the right decisions4. Understand where to look for bias and assumptions in problem5. Understand structure, standards and ethics of critical writing	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none">1. Analyse and compare techniques for comparing alternate solutions2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments3. Check for accuracy of data and use it as a tool for problem solving4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis.5. Employ evidence and information effectively
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UNIT 1: COMPONENTS OF CRITICAL THINKING

- 1.1 Applying Reason
- 1.2 Open Mindedness
- 1.3 Analysis
- 1.4 Logic

UNIT 2: NON-LINEAR THINKING

- 2.1 Step out of your Comfort Zone
- 2.2 Don't Jump to Conclusions
- 2.3 Expect and Initiate Change
- 2.4 Being Ready to Adapt

UNIT 3: LOGICAL THINKING

- 3.1 Ask the Right Questions
- 3.2 Organize Data
- 3.3 Evaluate Information
- 3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

- 4.1 Making Assumptions
- 4.2 Watch out for Bias
- 4.3 Ask Clarifying Questions
- 4.4 SWOT Analysis

UNIT 5: PROBLEM SOLVING

- 5.1 Identifying Inconsistencies
- 5.2 Trust your Instincts
- 5.3 Asking Ask?

METHODOLOGY	ASSESSMENTS
- Case Studies	- Online assignments
- Demonstration	- Individual and Group
- Presentations	
- Expert lectures	
- Writing and Audio-visual lessons	

LEARNING RESOURCES

learn.talentsprint.com

1. Calling Bullshit: The Art of Skepticism in a Data-Driven World. by Carl Bergstrom & Jevin West. ...
2. Thinking, Fast and Slow. by Daniel Kahneman. ...
3. Factfulness: Ten Reasons We're Wrong About The World — And Why Things Are Better Than You Think. ...
4. Box Thinking: The Surprising Truth About Success. ...

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| 2. No. of Assignments | : | <input type="text" value="3"/> | Max. Marks for each Assignment | : | <input type="text" value="5"/> |
| 3. No. of Quizzes | : | <input type="text" value="3"/> | Max. Marks for each Quiz Test | : | <input type="text" value="5"/> |

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24
VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS

(Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code : U22OE020EH
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the learners to:</p> <ol style="list-style-type: none">1. Understand the principles and mechanics of technical writing for students of engineering.2. Identify different kinds of business correspondences and the dos and don'ts for each of them.3. Make effective presentations as part of today's workplace demands.4. Recognize the need for Video and Written CVs with focus on specific elements.5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	<p>At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none">1. Write effective reports.2. Articulate business correspondences based on need.3. Make persuasive presentations.4. Design their videos CVs.5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

- 1.1 Informal Report Formats
- 1.2 Project and Research Reports
- 1.3 Formal Report Components, Feasibility Reports, Evaluation reports
- 1.4 Analytical and Informational reports
- 1.5 Executive summaries.

UNIT 2: BUSINESS CORRESPONDENCE

- 2.1 Electronic communication
- 2.2 Effective emails
- 2.3 Instant and text messaging guidelines

UNIT 3: PROFESSIONAL PRESENTATIONS

- 3.1 Paper presentations & Poster presentations
- 3.2 PowerPoint presentations
- 3.3 Storyboard writing

UNIT 4: RESUME & CVs

- 4.1 Technical Resume
- 4.2 Cover letter, resume format
- 4.3 Video CVs

UNIT 5: WRITING PROPOSALS & SOPs

- 5.1 Types of proposals
- 5.2 Request for proposals
- 5.3 Stating your objective.

METHODOLOGY

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

1. Read Me First!: A Style Guide for the Computer Industry by Sun Technical Publications
2. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss
3. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability | Third Edition | By Pearson Paperback –
4. The Design of Everyday Things: Revised and Expanded Edition Paperback – Illustrated, 5 November 2013 by Don Norman (Author)

The break-up of CIE : Internal Tests + Assignments + Quizzes

- | | | | | | |
|--------------------------|---|--------------------------------|-----------------------------------|---|---------------------------------|
| 1. No. of Internal Tests | : | <input type="text" value="2"/> | Max. Marks for each Internal Test | : | <input type="text" value="30"/> |
| 2. No. of Assignments | : | <input type="text" value="3"/> | Max. Marks for each Assignment | : | <input type="text" value="5"/> |
| 3. No. of Quizzes | : | <input type="text" value="3"/> | Max. Marks for each Quiz Test | : | <input type="text" value="5"/> |

Duration of Internal Test: 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

**Track-I: MATERIALS SCIENCE FOR ENGINEERS
SYNTHESIS AND PROPERTIES OF MATERIALS
(Open Elective-II)
SYLLABUS FOR B.E.IV-SEMESTER**

Instruction :3Hrs/Week	SEE Marks : 60	Course Code : U22OE420PH
Credits: 3	CIE Marks : 40	Duration of Semester End Exam:3 hrs

**UNIT I: SYNTHESIS OF MATERIALS- PHYSICAL METHODS
(10 hours)**

Solid state reaction, diffusion, melt quenching, vapor deposition, Chemical vapor deposition, physical vapor deposition, sputtering, mechanical milling, electron beam deposition.

**UNIT II: SYNTHESIS OF MATERIALS- CHEMICAL METHODS
(8 hours)**

Introduction, slow evaporation at room temperature, high-temperature solution growth, Sol-gel process, Aerosol method, Hydro-thermal process, Solvo-thermal synthesis, Photo-chemical synthesis.

UNIT III: Electrical Properties of Materials (8 hours)

The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matthiessen's rule, Thermal conductivity, Wiedemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

UNIT-IV: Physical properties of Materials (10 hours)

Fundamentals of magnetism, different types of magnetism, Permeability, Magnetic Hysteresis, Coercive force.

Young's modulus, Bulk modulus, Modulus of rigidity, tensile testing and tensile strength, breaking strength, plastic deformation, failure analysis, hardness-testing, Brinell's, Viker's impact testing – toughness, resilience, scratch test.

UNIT-V: Optical and Thermal Properties of Materials (10 hours)

Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.

Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

References:

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6th Edn, 2015
3. W.D. Callister Jr & David G. Rethwisch, Materials Science and Engineering an Introduction-, John Wiley, 10th Edn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid-State Physics, PHI, 2014.

The break-up of marks for CIE :

Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests:	2	Max. Marks for each Internal Tests:	30
2. No. of Assignments:	2	Max. Marks for each Assignments:	5
3. No. of Quizzes:	2	Max. Marks for each Quiz Tests:	5
Duration of Internal Tests		:	90 minutes

With effect from the Academic Year 2023-24
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Department of Physics

Track-II: Semiconductor Physics and Device Applications
Basic Semiconductor Devices
(Open Elective-II)
SYLLABUS FOR B.E.IV-SEMESTER

Instruction :3Hrs/Week	SEE Marks : 60	Course Code : U22OE410PH
Credits: 3	CIE Marks : 40	Duration of Semester End Exam:3 hrs

UNIT I: Junction Diode (8 hours)

Basic structure of PN junction, Band bending, zero bias condition, Expression for built in potential, Electric field and space charge width, Abrupt and Graded junctions, Diode equation, Effect of temperature on PN junction diode, Capacitive effects in PN junction, Diode –applications.

UNIT II: Metal-Semiconductor Junction (10 hours)

Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices (8 hours)

Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor (8 hours)

BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques (6 hours)

BJT fabrication: Diffused, point contact, fused or alloy and rate grown techniques, molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

The break-up of marks for CIE :

Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests:	2	Max. Marks for each Internal Tests:	30
2. No. of Assignments:	2	Max. Marks for each Assignments:	5
3. No. of Quizzes:	2	Max. Marks for each Quiz Tests:	5
Duration of Internal Tests		:	90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code:U22OE410MA
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none">1. Study the various numerical methods to solve Algebraic and Transcendental equations.2. Understand the methods to solve linear system of equations.3. Understand the numerical methods in interpolation and extrapolation.4. Understand the numerical methods in interpolation using central differences.5. Understand the numerical methods in solving ordinary differential equations.	<ol style="list-style-type: none">1. Apply the numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods2. Solve the linear system of equations using direct and iteration methods.3. Use the various numerical methods in interpolation and extrapolation.4. Use the various numerical methods in interpolation using central differences.5. Find the numerical solutions of ordinary differential equations.

Unit – I: (8Hours)

Solution of Algebraic and Transcendental equations:

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II: (8Hours)

Solution of linear system of equations:

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method- Ill-conditioned system of equations.

Unit – III: (8Hours)

Numerical differences-I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

Unit – IV: (8Hours)

Numerical differences-II

Central differences interpolation-Gauss's forwards and backward difference formulae-Stirling's formula- Bessel's formula.

Unit – V: (8Hours)

Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain&S.R.K.Iyengar, Narosa publishing house.

Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources :

- 1 <http://mathworld.wolfram.com/topics>
- 2 <http://www.nptel.ac.in/course.php>

The break-up of CIE : Internal Tests + Assignments + Quizzes

- | | | | | | |
|--------------------------|---|--------------------------------|-----------------------------------|---|---------------------------------|
| 1. No. of Internal Tests | : | <input type="text" value="2"/> | Max. Marks for each Internal Test | : | <input type="text" value="30"/> |
| 2. No. of Assignments | : | <input type="text" value="3"/> | Max. Marks for each Assignment | : | <input type="text" value="5"/> |
| 3. No. of Quizzes | : | <input type="text" value="3"/> | Max. Marks for each Quiz Test | : | <input type="text" value="5"/> |

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course- III (Aptitude-II)

SYLLABUS FOR B. E -IV SEMESTER

L:T:P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: U22BS430MA
Credits: 1	CIE Marks : 30	Duration of SEE : 2 Hours

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Students will be trained to enhance their employability skills. 2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning. 3. Students will be trained to work systematically with speed and accuracy while problem solving. 4. Students will be trained to apply concepts like percentages and averages to solve complex problems. 5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately. 	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Solve questions in the mentioned areas using shortcuts and smart methods. 2. Understand the fundamentals concept of Aptitude skills. 3. Perform calculations with speed and accuracy. 4. Solve complex problems using basic concepts. 5. Use shortcuts with ease for effective problem solving.
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**UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY
ADVANCED -1**

- 1.1 Time speed and distance
- 1.2 Boats and Streams
- 1.3 Problems on trains

UNIT 2: REASONING ABILITY- LOGICAL REASONING

- 2.1 Seating Arrangements- Linear; Circular; Complex
- 2.2 Venn diagrams
- 2.3 Syllogism
- 2.4 Cubes & Cuboids
- 2.5 Dices

UNIT 3: REASONING ABILITY- NON VERBAL REASONING

- 3.1 Figure Series
- 3.2 Directions
- 3.3 Clocks
- 3.4 Calendars

**UNIT 4: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY
ADVANCED -2**

- 4.1 Mensuration Part -1
- 4.2 Mensuration Part -2
- 4.3 Logarithms

UNIT 5: QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

- 5.1 Permutations and combinations
- 5.2 Probability

Prescribed textbook for theory:

- 1. Quantitative Aptitude S.CHAND by RS AGARWAL
- 2. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal

Suggested Reading

- 1. Learn.talentsprint.com/References Courses
- 2. Quantitative Aptitude Disha Publications
- 3. LOGICAL Reasoning Disha Publications

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	<input type="text" value="2"/>	Max.Marks	:	<input type="text" value="20"/>
2	No. of assignments	:	<input type="text" value="2"/>	Max. Marks	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks	:	<input type="text" value="5"/>
	Duration of Internal Tests	:	90 Minutes			

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Department of Computer Science & Engineering

Skill Development Course-IV (Technical Skills-II)

Problem Solving through Data Structures

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code: UII22PE430CS
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"> 1. Understand the Nonlinear data structures and their applications. 2. Prepare the students for the contests relative to the concepts learnt. 3. Build confidence in coding using Non Linear Data structures 4. Leverage the Industry Standards of the DBMS concepts 	<ol style="list-style-type: none"> 1. Learn non-linear data structures with various applications that are essential for solving problems which involve complex relationships, efficient searching, and hierarchical organization. 2. Solve scenario based problems using Tree Data structures 3. Learn and apply greedy algorithms for efficient solutions to complex problems. 4. Learn and apply database concepts for designing efficient, reliable, and well-structured databases that meet the needs of modern applications.

Problem Solving through Non-Linear Data structures – Trees I

Problem solving approaches using Non-linear data structures, Coding problems on the height of a binary tree, Size of a binary tree, Tree order traversals, Problem Solving on Binary Trees, Examples, Practice problems.

Problem Solving through Non-Linear Data structures – Trees II

Time comparison and analysis on Binary Search Trees & Coding problems,

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Search/probe sequence validation, Significance of height balancing the tree, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II

Algorithmic Thinking, Selection as Greedy Strategy, Heaps Min and Max, Priority Queues, Greedy Coin change solution, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II

Fractional Knapsack, Sequencing jobs with deadlines, Activity selection, Examples, Practice problems.

Problem Solving using DBMS I

Industry Standards of leveraging DBMS concepts: SQL Queries, Entity Relationship Models, Question, and answers.

Problem Solving using DBMS II

Industry Standards of leveraging DBMS concepts: Query Optimization, Transactions & Concurrency, Normalization, case studies, Question and answers

The break-up of CIE: Internal Tests + Assignments + Quizzes

1 No. of Internal Tests :

1

 Max. Marks for each Internal Test :

30

Duration of Internal Tests : 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS LAB
SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:U1122PC421CS
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES <i>On completion of the course, students will be able to</i>
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Apply NO-SQL concepts for given database. 4 Implement PL/SQL programs for creating stored procedures, cursors & triggers. 5 Design and implement an application using forms and reports.

Programming Exercise:

I. SQL

1. Creation of database tables without constraints.
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.
5. Exercising complex Queries.
6. Experiments on No-SQL.

II. PL/SQL

1. Demonstration of Blocks, Cursors, functions and Packages.
2. Demonstrate Exception Handling.
3. Usage of Triggers to perform operation on Single and Multiple Tables.
4. PL/SQL Procedures for data validation.

III. FORMS

1. Creation of forms for colleges Information System, Library Information System and Recruitment Cell.

IV. REPORTS

1. Creation of Reports based on different queries.
2. Creation of full-fledged Database Application.

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle, 4th Edition, PBP Publications.
2. Nilesh Shah, Database Systems Using Oracle, 2nd Edition (2007), PHI.
3. Rick F Van der Lans, Introduction to SQL, 4th Edition (2007), Pearson Education.
4. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rd Edition (2004), Person Education.
5. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition (2006), Pearson Education.
6. <https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

Longman Dictionary of Contemporary English - 6th Edition, 2020. (The students will be given the PDF format).

Learning Resources:

1. Balasubramanian: A textbook of English phonetics for Indian students, Macmillan, 2008.
2. Priyadarshini Patnaik : Group discussion and interviews, Cambridge University Press India private limited 2011.
3. Daniel Jones: Cambridge English Pronouncing Dictionary - A Definitive guide to contemporary English Pronunciation.