SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Applied Science

Syllabus For EE,CSE, EI, EC, IT, BC, IoT and AIADS Programs

Subject Category	BSC	Subject Code:	CHB101	Subject Name:	Applied Chemistry

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	20	10	150	3	-	2	4

Prerequisites:

Students who have completed 12th with Science stream or Chemistry of 12th standard or equivalent

Course Objective:

The main aim of Engineering Chemistry is to make Students familiar with basic concepts of Chemistry, the students face in industry and engineering field. With this background the Students will be able to explain Scientifically the various chemistry related problems in industry/engineering field.

Course Outcomes:

Student after successful completion of course shall possess skills to think critically and analyse chemistry problems in engineering field. Students are expected to solve the chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments and analyse experimental data.

CO's	CO's Description
CO1	Differentiate hard & soft water, solve the related numerical on water treatment and have knowledge regarding its Significance in industry and daily life.
CO2	Apply their knowledge regarding various types of fuels including petroleum fuels, Fuels Cells, Electrical Vehicle Batteries
CO3	Acquire basic knowledge of various types of Corrosion, its harmful effects and preventive methods.
CO4	To know basic concept of polymers and its properties.To have knowledge about advanced electroactive polymers and their applications. To know preliminary understanding of Nanomaterials and their applications.
CO5	Analyze the need of instruments. Identify and estimate about the unknown/new compounds with the help of spectroscopy/ chromatography.

UNIT	Descriptions	Hrs	CO's	Remarks
I	**WATER TECHNOLOGY:** Sources, Availability, impurities in Water, Types of hardness, Units of hardness. Concentration expression: Normality, Molarity, Molality. Water analysis techniques – Hardness determination by EDTA method, Alkalinity determination. Defects in boiler due to Hard water. External Treatment (Lime-soda, Zeolite & Ion exchange resin method) & Internal Treatment of Boiler feed water. Numerical Problems.	8	1	
II	**ELECTROCHEMISTRY & ENERGY STORAGE SYSTEMS:** Electrochemistry: Introduction, EMF of cell, Single electrode potential-Derivation of Nernst equation, Numerical problems based on Nernst Equation (E, E_o&E_{cell}). Energy Storage Systems: Introduction, Classification of batteries (primary, secondary and reserved batteries). Construction, working, and applications of Li-ion batteries. Advantages of Li-ion battery as an electrochemical energy system for electric vehicles. Recycling of Lithium-ion batteries by direct cycling Method. Introduction of Na- ion battery, graphene battery. Recycling, disposal and second use of batteries.	8	2	
III	**CORROSION, METHODS OF PREVENTION OF CORROSION** Introduction, Types of Corrosion, Disadvantages of corrosion, Theories of corrosion, Factors influencing the rate of corrosion. Methods of Prevention of Corrosion, Control of Environment, Alloying, Surface coatings, Metal coatings, Electroplating, Galvanization and Tinning, Inorganic coating, Anodizing, Cathodic Protection, Sacrificial Anode Method etc	8	3	

IV	**ENGINEERING MATERIALS:** Polymers: Nomenclature & classification of polymers. Electrically active polymers, Conducting polymers, **Liquid-crystal polymers (LCP),** Photoactive polymers, Photovoltaic materials: solar cells and dye sensitized solar cells- principle and applications, Conducting Polymers: Methods of synthesis and properties of polyaniline (PANi), polypyrrol (PPy) and polythiophene (PTh); applications of these polymers in advanced technologies. Nanomaterials: Synthesis, characterization and applications of nano materials (Eg. fullerene, graphene, carbon nanotubes and quantum dots) in electronic and nano devices. Introduction to Optical Fibres.	8	4	
V	**INSTRUMENTAL METHODS OF ANALYSIS:** Importance of Instrumental techniques. Classification of Instrumental techniques. Introduction to Electroanalytical and Spectroscopic Methods. Principle, Instrumentation, Working and applications of following techniques: Colorimetry, IR Spectroscopy, Conductometry, pH metry, Chromatography and Gas Chromatography.	8	5	
Guest Lectures (if any)				
Total Hours		40		

Suggestive list of experiments:

LABORATORY EXPERIMENTS:(Any 10 experiments to be performed)

1. To determine strength of unknown Ferrous Ammonium Sulphate $FeSO_4.(NH_4)_2SO_4.6H_2O$ (Mohr's Salt) solution by titrating it against intermediate Potassium Dichromate ($K_2Cr_2O_7$) solution using Di Phenyl Amine(DPA) as internal indicator.[Redox Titration]
2. To determine Temporary, Permanent and Total Hardness in given sample of water by E.D.T.A. method.[Complexometric Titration]
3. To determine strength of Sodium Carbonate and Sodium Bicarbonate in given alkaline solution by titrating with standard HCl using phenolphthalein and Methyl Orange indicators.
   Or
   To determine alkalinity in given water sample using Phenolphthalein and Methyl Orange indicators.[Acid Base Titration]
4. To determine strength of unknown $CuSO_4$ solution by titrating it against intermediate sodium thiosulphate (Hypo) solution using starch as final indicator.[Iodometric Titration]
5. To determine the chloride content of the given sample of water using silver nitrate solution with potassium chromate solution as an indicator.[Precipitation Titration]
6. To separate mixture of pigments by Thin Layer Chromatography [Instrumental Methods].
7. To separate mixture of pigments by Paper Chromatography [Instrumental Methods].
8. To verify Beer Lambert's law of colorimetry [Instrumental Methods].
9. To determine amount of Iron by colorimetry [Instrumental Methods].
10. To estimate amount of Iron by UV spectrophotometer.[Instrumental Methods]
11. To determine pH of given solution using pH meter. [Instrumental Methods]
12. To determine strength of acid/base by conductometric titrations. [Instrumental Methods]
13. To determine Moisture content in given sample of coal.[Proximate Analysis]
14. To determine Ash content in given sample of coal.[Proximate Analysis]
15. To determine the Viscosity Index of give lubricating oil by Redwood Viscometer No.1 and Redwood Viscometer 2.[Lubricating Oil Analysis]
16. To determine the Flash Point and Fire Point of lubricating oil by Abel's Apparatus.[Lubricating Oil Analysis]
17. To determine the Flash Point and Fire Point of lubricating oil by Pensky Martin's Apparatus.[Lubricating Oil Analysis]
18. To determine S.E.N. of given lubricating oil[Lubricating Oil Analysis].

TEXT BOOKS:

- Engineering Chemistry – Jain & Jain – Dhanpat Rai &Company Pvt. Ltd, New Delhi.
- A Text Book of Engineering Chemistry – S.S. Dara – S. Chand Publication, Delhi.
- Engineering Chemistry- Shashi Chawla, Dhanpat Rai &Company Pvt. Ltd, Delhi.
- Engineering Chemistry – Uppal – Khanna Publishers.
- A Text book of Engg. Chemistry- Agarwal, C.V, Murthy C.P, Naidu, BS Publication, Hyderabad.
- B. Sivasankar, Engineering Chemistry 1 st Edition, Mc Graw Hill Education (India), 2008
- O.G. Palanna, McGraw Hill Education (India) Private Limited, 9 th Reprint, 2015

REFERENCE BOOKS:

- Chemistry in Engineering and Technology, Kuriacose J.C. and Rajaram J.,Tata McGraw Hill.
- Applied Chemistry- Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
- Chemistry of Engineering Material-C.V. Agarwal, Andranaidu C. Parameswara Moorthy –B.S. Publications.
- William Kemp, Organic Spectroscopy, 3 rd edition, Palgrave, New York, 2005.

Modes of Evaluation and Rubric

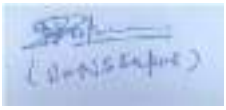
Evaluation will be continuous as an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and viva of each candidate.

List/Links of e-learning resource

- Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
- https://nptel.ac.in/course.html
- https://iln.ieee.org/resources/e-learning
- https://www.researchgate.net/publication/221928462_ELearning_Usage_During_Chemical_Engineering_Courses
- https://learncheme.com/
- https://www.anits.edu.in/elearn_c.php

Recommendation by Board of studies on	14.6.2022 (Tuesday)
Approval by Academic council on	16.6.2022 (Thursday)
Subject handled by department	Applied Science (Chemistry)

Dr Manju Singh
Prof & Head, Chemistry
UIT, RGPV, Bhopal



Dr Nitin Sapre
Prof & Head, Chemistry
SGSITS, Indore

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Dean, Academics
SATI, Vidisha

Dr Manoj Datar
Prof & Head, Chemistry
SATI, Vidisha

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
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Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSA101	Subject Name:	Introduction to Computer Science and Engineering

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Course Objective:

The objective of this course is to introduce the Computer Science and Engineering and Basic concepts of computers. To understand the component of computer and generation of computer. To familiarize students with the programming and problem-solving concepts using C Programming language. The course will help student to solve the problem using computer programming.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Familiarize the importance of computer science and engineering. Understand the concept of generation of computer and learn about component of computer system.
- CO2: Understand the concept of Problem-solving using C and Implement the flowchart and program for solving Mathematical and Engineering problems.
- CO3: Articulate the Modular Programming Concept and Solve the Engineering Problem using Modular Programming.
- CO4: Articulate the Advance C Programming Concept to Solve the Engineering Problem using Structure, Union and File Management.
- CO5: Describe the various Computer Science disciplines and their applications.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction to Computer Science and Engineering**: Computer: Definition, Classification, Generation, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software.	6	CO1
II	**Problem Solving using C**: Programming solving using computer concept, flowchart.Rules/ conventions of coding, documentation, naming variables, History of C, Structure of a C Program; Data types, Constant & Variable, naming variables, Operators (arithmetic, logical, bitwise, relational, ternary, Pointers - & and * operators) & expressions, Control Constructs – if-else, for, while, do-while, Case switch statement,Special constructs – Break, continue, exit(), goto& labels,Type conversion & type casting, Priority & associatively of operators; Type modifiers.	10	CO2
III	**Modular Programming:** Arrays; storage classes, Functions; Arguments; Return value; Parameter passing - call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variables; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion.	9	CO3
IV	**Advance C Programming:** Structure - basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures. Union - basic, declaration; Pre-processor Directives: C pre-processor - basics, #Include, #define, Enumerated data type; Typedef; File Handling in C- concepts, functions.	8	CO4
V	**Introduction to Computer Science disciplines and their applications**: Networking, Security, Operating System, Data Science, Machine Learning, Cloud Computing, Block chain, web development.	7	CO5
Guest Lectures (if any)		May be arranged as required	
Total Hours		**40**	

List of Experiments

1. Make a Poster on Component of Computer Systems/Generation of Computer System with their working. (CO1)
2. Write a program to determine given number is Armstrong number or not.(CO2)

3. Write a program to determine the roots of quadratic equation $ax^2+bx+c=0$(CO2)
4. Write a program to calculate the factorial of an integer quantity. (CO2)
5. Write a program to print diamond shape using star. (CO2)
6. Write a Program to find and print the sum of first N Prime Numbers.(CO2)
7. Write a program to convert binary to decimal and decimal to binary.(CO3)
8. Write a Program in C to read two arrays, add them and to print the resultant array. Use read_mat(),add_mat() and print_mat() functions. Array should not be declared as global variables. (CO3)
9. Write a program to read two matrix and apply addition, subtraction, multiplication, transpose operation and display result. (CO3)
10. Write a C Program to calculate area of triangle, rectangle, circle using function. (CO3)
11. Write a program using recursive function to output in reverse the sequence of characters input from the keyboard. The input is terminated by new line. Your output should be on a new line. Write an iterative solution for the same.
12. Write a Program to store data about 10 books. Which contain book title, price and number of copies of the book. After reading the data about books your program should display the data of all the book which cost more than Rs 200. (CO4)
13. Write a program using structure to accept the current time in (Hr:min:sec) , update it by one second and to print it. (CO4)
14. Write a program to count characters, spaces and new lines in a file. The name of the file should be entered through command line. (CO4)
15. Create a Poster on any one latest computer science and engineering disciplines. (CO5)

Text Book-

- Let us C By YashwantKanetkar, BPBPublication
- Programming in C, SchaumOutline,McGraw-Hill

Reference Books-

- Programming in ANSI-C By E. Balagurusami, TMHPublication
- C Programming language By Kernighan, Brian, W, Retchie, Dennis,PHI Publication
- Information Technology: Theory and Practice y PRADEEP K. SINHA (Author), PRITI SINHA (Author)

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/108/105/108105132/
2. https://de-iitr.vlabs.ac.in/

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Humanities and Management

Semester/Year		I/II	Program		B.Tech.
Subject Category	HSMC	Subject Code:	HUB101	Subject Name:	**Communication and Report Writing**

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical -		Total Marks				
End Sem	Mid-Sem	Quiz	Assign ment	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	-	0	3

Prerequisites:

In this era of Globalization and Information Technology, English has a special and predominant role in the communicative sphere and thus English commands the most prestigious position in the world in the exchange of information across geographical boundaries. The syllabus has been designed to develop linguistic and communicative competence of Engineering Students.

Course Objective:

1. To improve the language proficiency of the students in English with emphasis on LSRW Skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both formal and informal situations.

Course Outcomes:

1. Students will develop the ability to listen, speak, read and write effectively in both academic and non-academic environment.
2. The students will have an understanding of multidisciplinary contexts.
3. They will be able to successfully handle real life situations of business correspondence.
4. They will also develop the ability to analyse and interpret any technology related subjects.
5. Students will be in a position to make presentations on topics of technical and general interests; current issues related to politics; work and business environment.

UNITs	Descriptions	Hrs.	CO's
I	Significance of Communication: Process of Communication, The importance of Effective Communication in Business, Verbal and Non-Verbal Communication, Oral and Written Communication, Barriers to Communication.	10	1
II	Employability Traits: Job Interview (Body Language), Types of Interviews, Interview Skills, Employability Skills, Group Discussion.	6	2
III	Soft Skills: Goal Setting, Qualities of a good leader, Time Management, Time Wasters, Problem Solving.	8	3
IV	Report Writing: Definition, Importance, Types of Reports, Structure and Layout, Technical Writing, Essay Writing.	8	4
V	Applied Grammar in Communication: Articles, Punctuations, Question Tags, Subject-Verb, Agreement, Prepositions, Narration.	8	5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments: NA

1. NA

Text Book-

1. A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH Pub Sanjay Kumar PushpLata, English for Effective Communication, Oxford.

Reference Books-

- Language and Life: A Skills Approach Board of Editors,Orient Black Swan Publishers,
- India. 2018.
- 3. Business Correspondence and Report Writing - By R C Sharma; TMH.
- 4. Living English Structure – By W.S. Allen; Longmans.
- 5. English Grammar – Ehrlich, Schaum Series; TMH.

• 6. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman. • 7. New International Business English – by Joans and Alexander; OUP. • 8. Effective Technical Communication – Rizvi; TMH • 9. Body Language – Vinay Mohan Sharma
Modes of Evaluation and Rubric
Two mid semester tests, Quiz, Sessional an end semester examination.
List/Links of e-learning resource
• https://onlinecourses.nptel.ac.in • https://www.classcentral.com (swayam)

Recommendation by Board of studies on	26/02/2022
Approval by Academic council on	
Compiled and designed by	Dr. Amitish Singh, Dr. Manorama Saini and Dr. Veena Datar
Subject handled by department	Department of Humanities

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSA102	Subject Name:	Digital Electronics

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	100	3	0	2	4

Prerequisites:

Basics of Physics

Course Objective:

The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. To familiarize students with the different number systems, logic gates, minimization of logic circuits and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help student to design and analyze the digital circuits and systems.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Convert different number systems and codes used in digital circuits and systems.
- CO2: Simplify and analyze the digital logic circuits using Boolean algebra and other mapping techniques.
- CO3: Analyse and design different combinational logic circuits using different mapping techniques and mathematical tools.
- CO4: Compare different types of sequential circuits viz. counters in the domain of analysis.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction to Digital Electronics**: Review of number system and conversions; Binary Arithmetic, Signed and Unsigned representation, Binary codes, Gray Code, Code Conversions, Error detection and correction codes - parity check codes and Hamming code.	8	CO1
II	**Boolean Algebra and Switching Functions -** Study of basic logic gates, Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions - SOP and POS forms; Simplification of switching functions - K-map and Quine-McCluskey tabular methods.	8	CO2
III	**Combinational Logic Modules and their applications**: Adders, Subtractors, Code Converters, parity generators and comparators, Encoders & Decoders, BCD to seven-segment decoder, Multiplexers & Demultiplexers and their applications.	9	CO3
IV	**Sequential Circuits and Systems:** Set-Reset latches and flip flops, D-flipflop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge	7	CO4

	triggered flip-flop, T flip-flops, Shift registers, classification of shift registers.		
V	**Counters classification**: asynchronous counters, synchronous counters, counters design, BCD counter, MOD counters, ripple counter, Introduction to finite state machines.	8	CO4
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

Text Books-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, “Digital Fundamentals”, Pearson Education.
- A. Anand Kumar, “Fundamentals of Digital Circuits”, PHI.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

3. https://nptel.ac.in/courses/108/105/108105132/

https://de-iitr.vlabs.ac.in/

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Applied Science

Semester/Year		First Sem	Program		B.Tech.
Subject Category	BSC	Subject Code:	MAB101	Subject Name:	Linear Algebra and Calculus

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks				
End Sem	Mid-Sem	Quiz	Assign ment	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	1	-	4

Prerequisites:

Basic of Differentiations, Integrations and Matrices.

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes:

This course is to develop students abilities to:

1. Apply Differential Calculus to Notions of Curvature. Apart from some other Applications they will have a Basic Understanding of Taylor's Theorem, Maxima and Minima.
2. The Fallouts of Partial Differentiation that is Fundamental to Application of Analysis to Engineering Problems.
3. Finding area and Volume using Double and Triple Integrals.
4. The Essential Tool of Matrices and Linear Algebra in a Comprehensive Manner. Student will understand Matrices and their Application to Solve System of Linear Simultaneous Equations.
5. Students will Gain Experience with Problem Solving in Boolean Algebra and Graph Theory.

UNITs	Descriptions	Hrs.	CO's
I	**Differential Calculus:** Lebnitz Theorem, Expansion of functions by Maclaurins and Taylors theorem (one variable), Maxima & Minima of two variables, Curvature: Radius and Centre of Curvature for Cartesian Coordinates.	8	1
II	**Partial Differentiation:** Partial Derivatives of Higher Order, Homogeneous Functions, Euler's Theorem, Total differentiation, Errors and Approximations.	8	2
III	**Integral Calculus :** Definite Integral as a Limit of the Sum, Application in Summation of Series, Multiple Integrals, Change of order of Integration, Application of Double and Triple Integrals (Area & Volume).	8	3
IV	**Matrix :** Definition, Types & Properties of Matrices, Elementary Transformation, Rank of Matrix, Consistency of Linear System of Equations and their solutions, Eigen Values and Eigen Vectors, Cayley Hamilton Theorem and its Application to find the Inverse.	8	4

V	**Boolean Algebra & Graph Theory:** Algebra of logic, Principal of Duality and basic theorem, Boolean expression and Boolean functions, Definition of Graph, Types of Graphs, Sub Graphs, Walk, Path and Circuits,.	8	5
TOTAL HOURS		40	

Reference Books:

1. Engg. Mathematics: By B.S. Grewal
2. Boolean Algebra: R.S. Agrawal
3. Engg. Mathematics: by H.K. Dass
4. Engg. Mathematics : By B. V. Rammanna

Recommendation by Board of studies on	14-06-2022
Approval by Academic council on	16-06-2022
Compiled and designed by	Applied Maths Board of Studies, Chairman Dr. Shailesh Jaloree

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Humanities and Management

Semester/Year		II Year	Program		B. Tech All Branches
Subject Category	MAC	Subject Code:	MAC101	Subject Name:	**Universal Human Values and Professional Ethics**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
00	00	00	00	60	20	20	100	-	-	2	Grade

Prerequisites:

During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objective:

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

1. Develop a holistic perspective based on exploration about others and themselves.
2. Develop clarity, importance of harmony and humanity towards family, society and nature/existence.
3. Strengthen self-reflection.
4. Develop commitment and courage to act.

Course Outcomes:

1. By the end of the course, students will become aware of themselves, and their surroundings (family, society, nature)
2. They would have better critical ability.
3. They would become more responsible in life; and keeping human relationships and human nature in mind will be able to handle problems with sustainable solutions.
4. They would also become sensitive to their commitment towards nature and existence.
5. They would be able to apply what they have learnt to their own selves in different day-to-day real-life scenarios, at least a beginning would be made in this direction.

UNITs	Descriptions	Hrs.	CO's
I	Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration 2. Continuous Happiness and Prosperity- A look at basic Human Aspirations 3. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority 4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	8	1

	5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility.		
II	Understanding Harmony in the Human Being - Harmony in Myself! 1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body' 2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility 3. Understanding the characteristics and activities of 'I' and harmony in 'I' 4. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail 5. To ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods. Identifying from one's own life. Differentiate between prosperity and accumulation.	6	2
III	Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship 1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness. 2. Understanding the meaning of Trust; Difference between intention and competence. 3.Understanding the meaning of Respect, Difference between Respect and differentiation; the other salient values in relationship. 4.Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. 5. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Gratitude as a universal value in relationships. Elicit examples from students' lives.	4	3
IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence 1. Understanding the harmony in the Nature. 2. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature. 3. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. 4. Holistic perception of harmony at all levels of existence. 5. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.	8	4
V	Implications of the above Holistic Understanding of Harmony on Professional Ethics 1. Natural acceptance of human values. 2. Definitiveness of Ethical Human Conduct. 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop	9	5

	appropriate technologies and management patterns for above production systems. 5. Strategy for transition from the present state to Universal Human Order: a. as socially and ecologically responsible engineers, technologists b. At the level of society: as mutually enriching institutions and organizations.		
Guest Lectures (if any)		5	
Total Hours		40	
Suggestive list of experiments:			
Text Book-Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010			
Reference Books- 1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999. 2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.			
Modes of Evaluation and Rubric			
Questionnaire,Quiz,Presentation and standard procedure will be followed .			
List/Links of e-learning resource			
https://fdp-aicte-india.org https://vvce.ac.in			

Recommendation by Board of studies on	26/02/2022
Approval by Academic council on	
Compiled and designed by	Dr. Manorama Saini and Dr. VeenaDatar
Subject handled by department	Humanities and Management

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Applied Science (Physics)

Semester/Year		I/II	Program		B.Tech
Subject Category	BSC	Subject Code:	PYB101	Subject Name:	**Applied Physics**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Intermediate Physics (Theory and Lab)

Course Objective:

This course is designed to impart fundamental knowledge about some areas of physics which are to the core of emerging technologies. It is planned to provide knowledge about Quantum mechanics, Lasers , Fiber Optics, Hologhphy, Superconductor, Nano materials, Dielectric and piezoelectric materials. Laboratory sessions are also designed which are blended with experiments on the fundamental and advanced areas of physics.

Course Outcomes:

After completion of the course, students will be able

CO1	To understand basic quantum physics and apply it to the behaviour of a system at the microscopic level and solve the problems.
CO2	To understand process of lasers and explain the requirements, properties, classification of various lasers. They will also develop an understanding of optical fibers and and holography and can explin the characteristics, various losses, dispersion in optical fibers and procsees of construction and reprocuction of holograms.
CO3	To understand the basic concepts and theory of semiconductor for devices application.
CO4	To understand and know the principle of superconductors and nanomaterils. The sdunednt will be able to explain types of superconductors, their properties and applications, nano technology and its applications.
CO5	To understand the characteristic of Dielectrics and Piezoelectric materials in terms of their applications .
CO6	To perform experiments related to the course contents.

UNITs	Descriptions	Hrs.	CO's
I	**Quantum mechanics:** Planck's quantum hypothesis, Wave-particle duality of radiation, de-Broglie matter waves, Davisson and Germer's electron diffraction experiment, Compton effect, Phase and group velocity, Heisenberg uncertainty principle and its applications, wave function and its significance, Eigen value and Eigen function, Schrödinger wave equations, particle in one dimensional potential box.	8	
II	**Lasers:** Properties of lasers, the basic process of lasers, Population-inversion, classification of lasers, working of He-Ne, Ruby, Nd: YAG and CO_2 lasers, Applications of Lasers in Communication, Medical and Industry. **Optical fibers:** Light guidance through optical fibres, the qualitative idea of critical and acceptance angle, types of fibers, numerical aperture, V-Number, intermodal & material dispersions in fiber. **Holography:** Basic principle of holography, Construction and reconstruction of Image on hologram and applications of holography.	8	
III	**Basic of semiconductors**: Density of energy states, Energy-band formations, direct and indirect band gap, Effective mass, Fermi energy	8	

	levels. Mobility and carrier concentrations (intrinsic). Radiative and non-radiative recombination mechanisms in semiconductors . **Semiconductor Devices**: Properties of PN junction and I-V diode equation, Photovoltaic cell, LED Materials for fabrication, LED Structures and Characteristics; Injection Laser Diode (ILD) - Laser action in semiconductors , structures and efficiency.		
IV	**Superconductors**: Free electrons theory of metals, Temperature dependence of resistivity in superconducting Metals , Effect of magnetic field (Meissner effect) , Temperature dependence of critical field, Type I and Type II superconductors, BCS theory (Qualitative), High-temperature superconductors and Applications of superconductors. **Nanomaterials**: Basic principle of nanoscience and technology, structure, properties ad uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.	8	
V	**Dielectrics Materials**: Polar and Non-Polar Dielectrics, Dipole moment and Polarization, Dielectric constant& Polarization, Gauss law in Dielectric, the relation between electric field vector E, Pand D. **Piezoelectric materials**- Ferroelectric materials , Piezoelectric effect, direct and converse parameter definitions, Piezoceramics, Piezopolymers, Piezoelectric materials as sensor and transducers.	8	
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. To determine the width of a single slit from the study of Fraunhoffer diffraction pattern using a He-Ne Laser.
2. To determine the frequency of A.C. mains using an electrical - vibrator.
3. Determination of Planck's constant.
4. To determine the frequency of A.C. mains using a sonometer.
5. To study the nature of polarization of light using the half-wave plate.
6. To find the numerical aperture of the given fibre.
7. To determine the refractive indices μ_0 and μ_e of Quartz prism for ordinary and extraordinary rays using the spectrometer.
8. To determine the wavelength of monochromatic source of light by Fresnel's biprism.
9. To study the V-I characteristics of semiconductor diode
10. To study V-I Characteristics of LED
11. To study the V-I characteristics of tunnel diode
12. To determine the radius of curvature of a given plano-convex lens by Newton's rings method.
13. To determine the absorption coefficient of a glass plate by "LUMMER- BRODHUM" photometer.
14. To determine the resolving power of a telescope.
15. To determine the wavelength of light emitted by mercury vapour lamp using a diffraction grating.

Text Book-

- Concepts of Modern Physics, Arthur Beiser, Tata McGraw-Hill,6th edition,2009.
- Optics, A.Ghatak, McGraw Hill, 2012.
- Engineering Physics , Hitendra K Malik& A.K. Singh, Mc Graw Hill Education Private Limited
- Elements of Modern Physics, S.H. Patil
- Kiruthiga Sivaprastha, Modern Physics, S. Chand
- A Textbook of Engineering Physics, Gaur and Gupta, Dhanpat Rai Publishers, New Delhi,8th edition,.2011.

Electrical Engineering Materials by A.J. Dekker, PHI publication

Reference Books-

- Lasers and non-linear optics, B.B.Laud, New Age international,3rd edition,2011

- Solid State Physics, S.O.Pillai , New Age International Ltd, publishers
- Electromagnetic Theory for Telecommunications, C.S.Liu and V.K.Tripathi, Foundation Books, New Delhi,2007
- Quantum Mechanics by L.I. Schiff, Mc Graw Hill Co.
- A Textbook of Quantum Mechanics by Piravonu Mathews, K. Venkatesan (Tata McGraw Hill)
- Cady, W. G., Piezoelectricity, Dover Publication
- Piezoelectric Materials & Devices: Application in Engineering And Medical Sciences By M.S. Vijiya .CRC Press.
- Electrical Engineering Materials Physics Properties by SP A Seth, Dhanpat Rai Publications.

Modes of Evaluation and Rubric

Assignments, Quiz, Tests & exams

Criteria	**Excellent (3 points)**	**Good (2 points)**	**Fair(1 point)**
Quiz	> 80%	60-80%	40-60%
Test & exam	>75%	60 -75%	< 60%
Assignment	Assignment is coherently organized and the logic / solution to all the problems provided. Writing is clear and concise and persuasive.	Assignment is generally well organized and logic / solution to maximum of the problems provided barring few inaccuracies.	Assignment is poorly organized and difficult to follow. Does not flow logically from one part to another with lots of mistakes

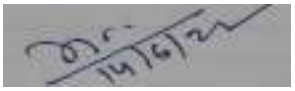
List/Links of e-learning resource

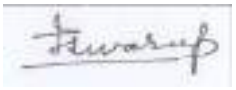
- https://nptel.ac.in/courses/122107035/#
- https://nptel.ac.in/course.html
- http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf
- https://physicstoday.scitation.org
- Barbastathis, G. and Sheppard C., Optics, https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2009/

Recommendation by Board of studies on	14.06.2022
Approval by Academic council on	
Compiled and designed by	Jetendra Parashar
Subject handled by department	Applied Science (Physics)









SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSA103	Subject Name:	Problem Solving using Data Structures

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Logical thinking and Computer Fundamentals

Course Objective:

Introduce the fundamentals of data structures and how these concepts are useful in problem solving.

Course Outcomes:

CO-1Understand- Problem solving using of data structure and various searching and sorting methods.
CO-2 Apply- Apply different concepts of data structures to solve different computing problems.
CO-3 Analyse- Analyze the access pattern of various data structure and understand their applicability.
CO-4 Evaluate-Evaluate and Compare the performance of different data structures on real world problems.
CO-5 Discuss- Graph and Tree structure with their operations and applicability

UNITs	Descriptions	Hrs.	CO's
I	Problem solving concepts: top-down, bottom-up design, Concept of datatype, variable, constant and pointers. Dynamic memory allocation. Algorithm: Definition and complexity Analysis. Introduction to data structure: Linear, Nonlinear, Primitive and Nonprimitive. **Arrays-**Concepts of Arrays, Single dimensional array, two-dimensional array- Representation and Address Calculation, Operations on arrays with algorithms (traversing, searching, inserting, deleting) and analysis.	08	
II	**List-**Singly linked lists: Representation in memory, Operations on singly linked list with algorithms (traversing, searching, insertion, deletion)Doubly linked list-Operations with algorithms and analysis. Circular linked lists-Operations with algorithms and analysis. Representation & manipulations of polynomials/sets using linked lists.	06	
III	**Stack-** Introduction to Stack and its operations, Implementation of stack using array and linked list with comparison. Application of stacks (Polish Notations, converting infix to postfix notation, evaluating postfix notation, Parenthesis balancing, Recursion). **Queue-** Introduction to Queue and its operations. Implementation of queue using array and linked list. De-queue, circular queue, priority queue. Applications of queue.	09	
IV	**Tree-** Definition and terminology, concept of binary tree and representation, Traversing binary tree (pre order, post order, in order) Operation with algorithm -insertion and deletion. Binary Search Trees and Concept of balance tree (AVL). **Graph-** Definition and terminology, Types of graphs, Representation of graph. Traversing of graph- Breadth First Traversing and Depth First Traversing.	09	

V	**Searching-** Search methods- Linear search, Binary search and Hashing (collision, chaining and probing) with their algorithms and analysis. **Sorting-**Sorting Methods-Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix sort, Shell sort with their algorithms and analysis.	08	
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

1. Write program to implement pointers and structure in C to understand the concepts of Dynamic memory allocation.
2. Write a program to implement concept of linear array with following operations:
   i. Traverse an array.
   ii. Find minimum item, maximum item, and average of an array items.
   iii. Insert a new item at beginning, end and middle position within an array.
   iv. Delete an item from an array.
3. Write a program to implement singly linked list with following operations
   i. Insert a new item at beginning, end and middle position within a single linked list.
   ii. Delete an item from single linked list.
   iii. Traverse a single linked list.
4. Modify the singly linked list program to make it for doubly linked list.
5. Write a program to implement Stack with its operations (Push, Pop, Peek, IsEmpty) using:
   i. Using array
   ii. Using linked list
6. Write a program to evaluate postfix notation using stack.
7. Write program to implement queue with its operations (enqueue, dequeue) using:
   i. Using array
   ii. Using linked list
8. Modify the queue program to implement circular queue with its operations.
9. Write a program to implement binary search tree with insert and delete operations.
10. Write a program to implement depth first traverse and breadth first traverse on a graph.
11. Write program to implement linear search and binary search on a given array.
12. Write a program to sort a given list of 10000 random integers and compare their execution time using:
    i. Bubble sort
    ii. Insertion sort
    iii. Merge sort
    iv. Quick sort
    v. Radix sort

Reference Books-

- Data Structure- Schaum's Series- McGraw Hill Publication
- Data Structure- Horwitz and Sartaj Sahni
- Data Structure through C, Yashwant Kanekar, BPB Publication.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ITC	Subject Code:	ITC101	Subject Name:	Python Programming

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

- High School Level Mathematics
- Elementary Knowledge of Computer

Course Objective:

This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming.

Course Outcomes:

Upon completion of this course, the student will be able to:

CO-1: Ability to install python and its different packages.
CO-2: Implement solution logic of problem and draw it in the form of algorithm.
CO-3: Design and write a python program for given algorithm.
CO-4: Understand and apply the list logics to problem solution.
CO-5: Understand Object Oriented with reference to python programming.

UNITs	Descriptions	Hrs.	CO's
I	Introduction to computer science, algorithms, data representation in computers, hardware, software and operating system. Installation of python- interactive shell, IDLE, saving, editing, and running a script. The concepts of datatypes: variables, immutable variables, numerical types, operators, expressions, Indentation and comments in the program.	8	CO1
II	Conditional Statements- Conditions, Boolean Logic, Logical operators and Ranges. Control Statements- Break, Continue and Pass. Flow Control-if, if-else, nested if-else, Loop statements- for loop, while loop, Nested loops.	8	CO2
III	String: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Strings and text files, manipulating files and directories, os and sys modules, text files: reading/writing text and numbers from/to a file, creating and reading a formatted file (csv or tab-separated).	9	CO3
IV	Lists, tuples, and dictionaries. Basic list operators, replacing, inserting, removing an element, searching and sorting lists, dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.	7	CO4
V	Classes and OOP: Classes, objects, attributes and methods, defining classes, design with classes, Inheritance, Overloading, Overriding, and Data hiding. Exception: Exception Handling, except clause, Try finally clause, User Defined Exceptions.	8	CO5
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

1. Write a program in python to check a number whether it is prime or not.
2. Write a program to check a number whether it is palindrome or not.
3. Write a function to swap the values of two variables through a function.

4. Write a python program to Read a file line by line and print it.
5. Write a program to display the number of lines in the file and size of a file in bytes.
6. Write a program to calculate the factorial of an integer using recursion.
7. Write a program to print Fibonacci series using recursion.
8. Write a program for binary search.
9. Python Program for Sum of squares of first n natural numbers.
10. Python Program to find sum of array.
11. Python program to read character by character from a file.
12. Python Program to print with your own font.
13. Python program to print even length words in a string.
14. Python program to check if a string is palindrome or not.
15. Program to print ASCII Value of a character.
16. Python program to find smallest and largest number in a list.
17. Python program to find the size of a Tuple.

Text Books-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, “Digital Fundamentals”, Pearson Education.
- A. Anand Kumar, “Fundamentals of Digital Circuits”, PHI.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

4. https://nptel.ac.in/courses/108/105/108105132/
5. https://de-iitr.vlabs.ac.in/

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Information Technology

Semester/Year		II/I	Program		B.Tech					
Subject Category	ESC	Subject Code:	CSA104	Subject Name:	Principles of System Software					

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	-	-	3

Prerequisites:

Fundamental knowledge of Computer

Course Objective:

- To understand the relationship between system software and machine architecture.
- To understand the processing of an HLL program for execution on a computer.
- To understand the process of scanning and parsing.
- To know the design and implementation of assemblers, macro processor, linker and compiler.
- To have an understanding of loaders, system software tools.
- To understand and know the working of device drivers

Course Outcomes:

On successful completion of the course, the student will:

1. Be able to compare various system software related to the given system
2. Be able to understand the concepts required to develop the system software
3. Be able to make proper use of system software tools

UNITs	Descriptions	Hrs.	CO's
I	**System Software and Language Processors software tools:** Introduction, Language Processing Activities, Fundamentals of Language Processing & Language Specification, and Language Processor Development Tools. **Data Structures for Language Processing:** Search Data structures, Allocation Data Structures. **Software Tools:** Software Tools for Program Development, Editors, Debug Monitors, Programming Environments, User Interfaces.	8	1
II	**Assemblers:** Elements of Assembly Language Programming, A Simple Assembly Scheme, Pass Structure of Assemblers, Design of a Two Pass Assembler,	8	1
III	**Macros and Macro Processors:** Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a Macro Preprocessor.	9	2
IV	**Interpreters:** Use and overview of interpreters, Pure and impure interpreters.	5	2
V	**Linkers and Loaders:** Introduction to linkers, Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs and Loaders	10	3
Guest Lectures (if any)		NIL	
Total Hours		40	

Suggestive list of experiments:

Text Book-

- D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised

Edition, Tata McGraw-Hill, 1999.
Reference Books- ● Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd ● Edition, Pearson Education Asia, 2000. ● Santanu Chattopadhyay, “System Software”, Prentice-Hall India, 2007 ● Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, “Compilers: Principles, Techniques, and Tools”,2nd Edition, Pearson Education Asia
Modes of Evaluation and Rubric
List/Links of e-learning resource

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Applied Science

Semester/Year		Second/First	Program		B. Tech.
Subject Category	BSC	Subject Code:	MAB 102	Subject Name:	Statistics : Probability Distributions and Differential Equations

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	1	-	4

Prerequisites:

Basics of Differentiations, Integrations and Statistics.

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in Differential equations and Statistics. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes:

This course primarily contributes to applied mathematics program outcomes that develop students abilities to:

1. Acquire the basic knowledge of Statistics: Probability Distributions with their applications and fitting of curves using method of least squares.
2. Learn the principal concepts about sampling and its advantages and also categorized the sampling methods.
3. The Effective Mathematical Tools for the Solutions of Differential Equations that Model Physical Processes.
4. Differential Equation for Solving Engineering Problems
5. Partial Differential Equations are very much useful for Solving Various Boundary Value Problems

UNITs	Descriptions	Hrs.	CO's
I	Binomial, Poisson and Normal distributions and their Mean and Variance, Methods of Least Squares and curve fitting.	8	1
II	Sampling distributions: t, F, χ^2 distributions and their applications.	8	2
III	Differential Equations: Differential Equations of first order and first degree, first order and higher degree, Linear Differential Equation, Non-linear Differential Equation, Linear Differential of Higher orders with constant coefficient. Method of Variation of Parameters.	8	3
IV	Differential Equation of other Types: Homogeneous Linear Differential Equations, Legendre Linear Equation, Simultaneous Linear Differential Equation.	8	4
V	Partial Differential Equations: Definition and formation of Partial Differential Equations, Lagrange's Linear PDE, Non-linear PDE, Linear Partial Differential Equation of Second Order with Constant Coefficients. Applications of PDE (Wave equation and Heat Equations)	8	5
Total Hours		40	

Reference Books:

1. Higher Engineering Mathematics by B. S. Grewal 2. Engineering Mathematics by B. V. Rammana
3. Advance Engineering Mathematics by E. Kreyszig 4. Veerarajan T, Statistics, Probability and Random Process, 2nd Edition, Tata McGraw Hill Publishing company Ltd., New Delhi

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSL110	Subject Name:	Computer Workshop (Linux Lab)

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
--	--	--	--	30	10	10	50	1	--	2	2

Prerequisites:

Course Objective:

1. To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters.
2. To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
3. To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
4. To facilitate students in understanding Inter process communication.
5. To facilitate students in understanding semaphore and shared memory.
6. To facilitate students in understanding process.

Course Outcomes:

Upon completion of this course, the student will be able to:

CO1. Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator.
CO2. Ability to write Shell Programming using Linux commands.
CO3. Ability to design and write application to manipulate internal kernel level Linux File System.
CO4. Ability to develop IPC-API's that can be used to control various processes for synchronization.
CO5. Ability to develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

UNITs	Descriptions	Hrs.	CO's
I	**INTRODUCTION TO LINUX AND LINUX UTILITIES**: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor. Linux commands, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text Processing utilities and backup utilities	4	CO1
II	**Introduction to Shells**: Linux Session, Standard Streams, Redirection, Pipes, Command-Line Editing, Options, Shell/Environment Customization. **Filters:** Filters and Pipes, Concatenating files, Display Beginning and End of files, Operations on Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.	4	CO2
III	**Grep:** Operation, grep Family, Searching for File Content. **Sed**: Scripts, Operation, Addresses, commands, Applications, grep and sed. UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers. **File Management**: File Structures, System Calls for File Management, Directory API.	4	CO3
IV	**PROCESS AND SIGNALS**: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, zombie processes, orphan process, unreliable	4	CO4

	signals, interrupted system calls. **File locking**: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks.		
V	**INTER PROCESS COMMUNICATION**: Pipe, process pipes, the pipe call, parent and child processes, and named pipes, semaphores, message queues, shared memory. **INTRODUCTION TO SOCKETS**: Socket, socket connections - socket attributes, socket addresses.	4	CO5
Guest Lectures (if any)		--	
Total Hours		20	

List of Experiments

1. Write a program using echo, printf, script, passwd, uname, who, date, stty, pwd commands.
2. Write a program using unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp commands.
3. Write a program using telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk commands.
4. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
5. Illustrate by writing script that will print, message "Hello World, in Bold and Blink effect, and in different colours like red, brown etc using echo commands?
6. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
7. Illustrate by writing script using for loop to print the following patterns?
8. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
9. Write a program inter-process communication.
10. Write a program to communicate using sockets.

Text Books-

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.
2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson

REFERENCES Books-:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX Network Programming, W.R. Stevens, PHI. UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Quiz/ Assignments, term work, and end-semester practical examinations.

List/Links of e-learning resource

Recommendation by Board of studies on	July-2024
Approval by Academic council on	July-2024
Compiled and designed by	IT Department
Subject handled by department	IT Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Humanities and Management

Semester/Year	II Year	Program		B.Tech All Branches
Subject Category: MAC	Subject Code:	MAC102	Subject Name:	Professional Ethics and Social Responsibility

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
00	00	00	00	30	10	10	50	0	0	2	Grade

Prerequisites:

To enable the students to instill moral, to create an awareness of professional ethics, human values, loyalty and social responsibility.

Course Objective:

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

1. To learn the importance of values and ethics in personal life and professional careers.
2. To gain knowledge of ethical behavior.
3. To acquire the basics of social responsibility.

Course Outcomes:

1. To imbibe and internalize the basic purpose of human values.
2. To appreciate professional rules and codes of conduct in personal life and professional careers.
3. To know the importance of values and ethics in professional behavior.
4. To impart norms of professional ethics in life through **rationality**, **consistency** and **impartiality**.
5. To inculcate the sense of social responsibility.

UNITs	Descriptions	Hrs.	CO's
I	Principles of professional ethics: honesty, trustworthiness, loyalty, being law-abiding, no sinister motives, socially responsible, respect, accountability and fairness to all	8	1
II	Codes of conduct: public, clients, professional community, profession, workplace rights and responsibilities, other stakeholders.	6	2
III	Factors necessitating professional ethics: advisory responsibilities, contractual duties; The importance of ethical behavior in business.	4	3
IV	Personal ethics: impartiality, rationality, consistency and reversibility Norms of professional ethics in our life.	8	4
V	Corporate social responsibility: environmental, philanthropic, ethical,	9	5

	and economic responsibility.		
Guest Lectures (if any)		2	
Total Hours		40	

Suggestive list of experiments:

1. N.A

1. Text Book- Professional ethics includes Human values, R. Subramanian, Oxford higher education.

Reference Books-

2. Professional Ethics and Social Responsibility, Daniel E. Wueste, Rowman and Littlefield Publication, INC
3. Professional ethics and human values, R. S. Naagarazan, New age international (P) limited ,New Delhi,2006.
4. Human values and professional ethics,Jayshree Suresh, B. S. Raghvan,S. Chand
5. http://www.slideword.org/slidestag.aspx/human-values-and-Professional-ethics.

Modes of Evaluation and Rubric

Questionnaire,Quiz,Presentation and standard procedure will be followed .

List/Links of e-learning resource

- https://onlinecourses.nptel.ac.in
- https://www.classcentral.com (swayam)

Recommendation by Board of studies on	26/02/2022
Approval by Academic council on	
Compiled and designed by	Dr. Manorama Saini and Dr. VeenaDatar
Subject handled by department	Humanities and Management

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA(M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
Bachelor of Technology B. Tech in Information Technology

Semester/Year		III/II		Program			B. Tech– Information Technology				
Subject Category	DC	Subject Code:		IT-302		Subject Name	Communication System				
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Knowledge of calculus.

Course Objective:

- The purpose of the course is to teach the fundamental principle of Communications.
- To equip students with various issues related to analogue communication such as modulation, demodulation, transmitters and receivers and noise performance.

UNITs	Descriptions	Hrs.
I	Signals Analysis: Review of Fourier Transformation, signal transformation and its properties through linear system, signal distortion in transmission, bandwidth and risetime, energy and power density and Parseval's theorem for energy and power signals, convolution & correlations.	8
II	Linear Modulation: Necessity of modulation, principal of amplitude modulation generation and detection of DSB-SC, SSB-SC and VSB-SC, AM-LC, Comparison of various AM systems, FDM and TDM.	8
III	Angle Modulation - Definition and relationship between PM and FM frequency deviation, Bessel's function, spectrum and transmission BW of FM, NBFM, WBFM, phase diagram of FM signals in FM systems, comparison of AM and FM systems. Digital Modulation: Block diagram of PCM system, Inter-symbol Interference, Compounding, Delta Modulation (DM), Limitation of DM, ADM, Comparison between PCM & DM, DPCM.	8
IV	Radio transmitter and receiver: Different type of AM and FM transmitters and receivers, AM and FM standard broadcast calculation of noise for signal and cascaded stages. Noise-performance of analog communication systems: SNR, Noise figure. Line Codes. Data Transmission: Generation and Detection of ASK, FSK, PSK, DPSK, QPSK.	8
V	Information Theory: Unit of Information, Entropy, Rate of Information, Joint & Conditional Entropy, Mutual Information, Channel Capacity, Shawn's Theorem, Shannon Harder Theorem, Coding Efficiency, Shannon Fano Coding, Hoffman Coding, Blocks Codes.	8
Total Hours		40

Course Outcomes:

CO-1: Explain the fundamentals of analog and digital Signals and Communication System

CO-2: Apply Fourier Transform to communication signals and derive the power spectral density of signals.

CO-3: Define, formulate and analyze various techniques for amplitude and angle modulation.

CO-4: Analyze different techniques for digital data transmission and analyze the performance of spread spectrum communication systems.

CO-5: Understand the fundamentals of Information Theory.

Text Book

- Taub and Schilling: Principles of Communication System, TMH.
- Simon Haykin: Digital Communication, John Wiley.

Reference Books

- G. Kennedy: Electronic Communication System, TMH.
- J.G. Proakis: Digital Communications, MGH.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	2	2	2										1	2
CO-3	2	1	2										1	2
CO-4	2	1	2											2
CO-5	2	2	1										1	2

Suggestive list of experiments:

1. To study and Perform Amplitude Modulation & Demodulation.
2. To study Frequency Modulation and Demodulation.
3. To study Pulse Amplitude Modulation and Demodulation.
4. To study Pulse Width Modulation and Demodulation.
5. To study Pulse Position Modulation and Demodulation.
6. To study Pulse Code Modulation and Demodulation.
7. To study Time Division Multiplexing (TDM) system.
8. To study Amplitude Shift Keying (ASK) Modulation and De-Modulation.
9. To study Frequency Shift Keying (FSK) Modulation and De-Modulation.
10. To study Phase Shift Keying (PSK) Modulation and De-Modulation.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA (M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
Bachelor of Technology B. Tech in CSE (Information Technology)

Semester/Year		III/II	Program		B. Tech– Information Technology					
Subject Category	DC	Subject Code:	IT-303	Subject Name	Object Oriented Programming					
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Elementary set theory, concepts of relations and functions, mathematical induction, data structures, programming practices with programming language

Course Objective:

A) Enable students to understand concepts and principles of object-oriented programming methodologies using JAVA as a vehicle.

B) Also learn software development and problem solving using this JAVA technology.

UNITs	Descriptions	Hrs.
I	Introduction: Procedural Paradigms of programming, Object Oriented Paradigm for programming, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP. OOP Concepts: Data Abstraction, Encapsulation, Inheritance and Polymorphism. Introduction of Java, Features of Java, Byte Code and Java Virtual Machine, Java Development Kit (JDK).	8
II	Command Line Argument, Classes and Objects, Encapsulation, Tightly Encapsulated classes, Nested class, Inner class, Anonymous inner class. In built classes: Object, String, String Buffer, Array, Vector. Wrapper classes. Data members, member Function, Data Hiding: Visibility modifiers in java.	8
III	Is-A relationship, Has-A relationship, Inheritance in Java, types of inheritance, Super and subclass, Method Signature. Overloading, Constructor Overloading, Method Overloading, this and static keyword, finalize () method, Casting objects, Instance of operator, Overriding, covariant return type. Super, final keyword, overloading vs. overriding. Static control flow, instance control flow.	8
IV	Abstraction: Abstract class, Interface in Java, differences between classes and interfaces. Defining an interface, implementing interface, applying interfaces, variables in interface, extending interfaces. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Coupling, Cohesion.	8
V	Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception subclasses. Multithreading: Concepts of Multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface. Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.	8
Total Hours		40

Course Outcomes:

CO1: Define classes, objects, members of a class and relationships among them.

CO2: Design java application using OOPs principles.

CO3: Design java application using constructors, overloading and overriding concepts.

CO4: Demonstrate package creation and exception handling.

CO5: Understand and develop multithreaded application programs.

Text Book

- Naughton& Schildt, "TheCompleteReferenceJava2", Tata McGraw Hill
- E Balaguruswamy, "Programming in Java", TMH Publications

Reference Books

- Deitel "Java – How to Program: "Pearson Education, Asia
- Horstmann & Cornell, "Core Java2"(Vol I &II), Sun Microsystems
- IvanBayross,"java2.0", BPB publications

List/ Links of e-learning resource

https://archive.nptel.ac.in/courses/106/105/106105153/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two midsemester Tests, Quiz/ Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	1	1									3	3	3
CO-2	3	1		1	2							2	1	3
CO-3	3	2	1									2	2	1
CO-4	3	3	2	3	2	1			1	2		3		3
CO-5	3	3	3	2	1				2		2	2	3	

Suggestive list of experiments:

1. Write a program to display any message. (CO1)
2. Write a Java program to display the default value of all primitive data types of Java. (CO1)
3. Write a program to give an example of control statements. (CO1)
4. Write a program and give an example for command line arguments. (CO2)
5. Write a program to create a room class, the attributes of this class is room no, room type, room are a and AC machine. In this class the member functions are set data and display data. (CO2)
6. Write a program to create a class 'simple object '. Using the constructor display the message. (CO3)
7. Write a program to give the example for 'this' operator. And also use the 'this' keyword as return statement. (CO3)
8. Create a class named as 'a' and create a subclass 'b'. Which is extends from class 'a'. And use these classes in 'inherit' class. (CO3)
9. Write a program to give an example of method overloading and overriding concepts. (CO3)
10. Write a program to give a simple example for abstract class. (CO4)
11. Write a program to give example for multiple inheritance in Java. (CO4)
12. Write a program to illustrate usage of try/ catch with finally clause. (CO5)
13. Write a program to create two threads. In this class we have one construct or used to start the thread and run it. Check whether these two threads are run are not. (CO5)

Recommendation by Board of studies on	Dec-2024
Approval by Academic council on	Dec-2024
Compiled and designed by	Department of IT
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA (M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
Bachelor of Technology B. Tech in Information Technology

Semester/Year		III/II		Program			B. Tech– Information Technology				
Subject Category	DC	Subject Code:		IT-304		Subject Name	Analysis and Design of Algorithms				
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

- Math foundations: elementary set theory, concepts of relations and functions, mathematical induction
- Data structures &Algorithms.
- Programming languages: a general-purpose programming language

Course Objective:

A) Determine different time complexities of a given algorithm
B) Demonstrate algorithms using various design techniques.
C) Develop algorithms using various design techniques for a given problem.

UNITs	Descriptions	Hrs.
I	Algorithms: Definition and characteristics. Analysis: Space and Time Complexity, Asymptotic Notations, Time Complexity Analysis of algorithms (Linear Search, Insertion Sort etc.) Recursive algorithms and recurrence relations. Solutions of recurrence relations. Divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, quick sort, merge sort, Heap Sort, Strassen 's matrix multiplication with their complexity analysis.	8
II	Greedy Algorithms: Knapsack problem, Job sequencing with deadlines, optimal merge patterns, Huffman coding, Dynamic Programming: Multistage Graph, all pairs shortest paths,0-1 Knapsack, Chained matrix multiplication, Longest common subsequence, Travelling salesperson problem.	8
III	Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms- Dijkstra's Algorithms and Complexity Analysis, Transitive closure, Minimum Spanning Tree- Prim's and Kruskal's Algorithm and their complexity analysis, Union Find Data Structure, Topological sorting, Network Flow Algorithm.	8
IV	Branch & Bound technique: Definition and application to solve 0/1 Knapsack Problem, 8-puzzle problem, travelling salesman problem. Back tracking concept and its examples like 8Queens's problem, Hamiltonian cycle, Graph Coloring problem.	8
V	Tractable and Intractable Problems: Computability of Algorithms- P, NP, NP-complete and NP hard. Introduction to Approximation Algorithms, NP-complete problems and Reduction techniques. Lower bound theory and its use in solving algebraic problem.	8
Total Hours		40

Course Outcomes:

CO1: Explain the inherent mechanism involved in functioning of an operating system. Differentiate and justify the need of various operating systems.

CO2: Analyse various scheduling techniques with their comparisons.

CO3: Analyse various synchronization techniques with their comparisons derive the solution for deadlock situation.

CO4: Describe memory management system of an operating system. Analyse and compare various management schemes.

CO5: Describe and Analyze File and Disk management Techniques.

Text Book

- Ellis Horowitz, Sartaj Sahni and Sangu Thevar Rajasekaran, "Fundamentals of Computer Algorithms", Universities Press,2nd edition (2008), ISBN-13:978-8173716126.

Reference Books

- Thomas Cormen, Charles Leiser son, Ronald Rivest and Cliford Stein, "Introduction to Algorithms", PHI, 3rdedition, ISBN-13:978-8120340077
- Gilles Brassard and Paul Bratley, "Fundamentals of Algorithmics", PHI, ISBN-13:978-8120311312

List/Links of e-learning resource

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

Cos	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	
CO-2		3	3	2	3									
CO-3	2	3	3	3	2									
CO-4		2	3	3										
CO-5		3	2	3										

Suggestive list of experiments:

1. Write a simple c program to add two integer numbers. (CO1)
2. Implement factorial of given number using iteration method and recursive Method. (CO1)
3. Implement logic to swap two integer number using three different approach. (CO2)
4. Implement Algorithm to determine given number is divisible by 5 or not without using % Operator. (CO2)
5. Implement Algorithm to convert binary number to decimal number without using array and Power function. (CO3)
6. Implement Algorithm to print reverse of string using recursion and without using character Array. (CO3)
7. Implement Linear Search Algorithm. (CO4)
8. Implement Binary Search Algorithm (By using Iterative Approach) (CO4)
9. Implement Binary Search Algorithm (By using Recursive Approach) (CO4)
10. Implement Insertion Sort Algorithm (CO5)
11. Implement Quick Sort Algorithm (By using Recursive Approach) (CO5)

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA (M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF IT

Semester/Year		III/II		Program		B. Tech– Information Technology				
Subject Category	DC	Subject Code:	IT-305	Subject Name		Computer System Organization				
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10				100	3	0	0	3

Prerequisites:

Fundamental knowledge of digital electronics.

Course Objective:

- Understand the organization and architecture of computer systems and electronic computers.
- Study the assembly language program execution, instruction format, and instruction cycle.
- Design a simple computer using hardwired and microprogrammed control methods.
- Study the basic components of computer systems besides computer arithmetic.
- Understand input-output organization, memory organization and management, and pipelining.

UNITs	Descriptions	Hrs.
I	Introduction: Function and structure of a computer, Functional components of a computer, Interconnection of components, Performance of a computer, Register Transfer language: Register Transfer, Bus and Memory Transfers, Three-Stare Bus Buffers, Memory Transfer, Arithmetic Microoperations Binary Adder, Binary Adder-Subtractor, Binary incrementor, Arithmetic Circuit, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, List of Logic Microoperations, Shift Micro operations, Arithmetic Logic Shift Unit	6
II	Control unit: Control memory, address sequencing, microprogram example, Micro instruction Format, Symbolic Micro instructions, The Fetch Routine, Symbolic Microprogram and design of the control unit, Microprogram Sequencer.	6
III	CPU design: Instruction cycle, data representation, memory reference instructions, input-output, and interrupt, addressing modes, data transfer, and manipulation, and program control. Computer arithmetic: Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.	8
IV	Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory; Input or output organization: Input or output Interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.	8
V	Pipeline: Parallel processing, pipelining-arithmetic pipeline, instruction pipeline; Multiprocessors: Characteristics of multiprocessors, interconnection structures, inter-process or arbitration, inter-process or communication, and synchronization.	7
Total Hours		35

Course Outcomes:

CO1: Understand the organization and levels of design in computer architecture and understand the concepts of Register transfer languages.

CO2: Describe arithmetic micro-operations, logic micro-operations, shift micro-operations address sequencing, microprogram example, and design of control unit

CO3: Understand the Instruction cycle, data representation, memory reference instructions, input-output, and interrupt, addressing modes, data transfer, and manipulation, program control. Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.

CO4: Knowledge about Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory Input or output Interface, asynchronous data transfer, modes of transfer, Priority interrupt, and direct memory access.

CO5: Explore the Parallel processing, pipelining-arithmetic pipeline, instruction pipeline Characteristics of multiprocessors, interconnection structures, inter-processor arbitration, inter-processor Communication, and synchronization.

Text Books-

1. M. Morris Mano, "Computer Systems Architecture", Pearson, 3rd edition.

Reference Books-

1. John D. Carpinelli, "Computer Systems Organization and Architecture", Pearson, 1stEdition.
2. Patterson, Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann.

List/Links of e-learning resource

- https://archive.nptel.ac.in/noc/courses/noc22/SEM1/noc22-cs15/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	2	2	2										1	2
CO-3	2	1	2										1	2
CO-4	2	1	2											2
CO-5	2	2	1										1	2

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of IT

28.03

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA (M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
Bachelor of Technology B. Tech in Information Technology

Semester/Year		III/II	Program		B. Tech– Information Technology
Subject Category	DLC	Subject Code:	IT-306	Subject Name	Internet Programming

Maximum Marks Allotted

Theory				Practical			Total Marks	Contact Hours			Total Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
--	–	–	–	30	10	10	50	0	0	4	2

Prerequisites:

Fundamental knowledge of programming

Course Objective:

Understand static and dynamic webpages.

UNITs	Descriptions	Hrs.
I	WEBSITE BASICS, Web Essentials: Clients, Servers and Communication, The Internet, Basic Internet protocols, World wide web.	8
II	HTTP Request Message, HTTP Response Message, Web Clients, Web Servers, HTML5, Tables, Lists, Image, HTML5 control elements, Semantic elements, Drag and Drop, Audio, Video control	8
III	CSS3, Inline, embedded and external style sheets, Rule cascading, Inheritance, Backgrounds, Border Images, Colors Shadows, Text, Transformations, Transitions, Animations.	8
IV	JavaScript: An introduction to JavaScript, JavaScript DOM Model-Date and Objects, Regular Expressions.	8
V	Exception Handling-Validation-Built-in objects-Event Handling-DHTML with JavaScript. XML-Elements, attributes, parser, DOM, query.	8
Total Hours		40

Course Outcomes:

CO1: To understand and interpret the basic concepts of the Internet, tools.
CO2: To understand, analyse CSS components and apply them webpage design tools like HTML, CSS.
CO3: To know and analyse client-side scripting language concepts.
CO4: Design and Develop Internet applications with the help of Java script.

Text Book & Reference Books-

Achyut Godbole, Atul Kahate "Web Technologies: TCP/IP, Web/Java Programming, and Cloud Computing", Third Edition, McGraw Hill Education.
Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program ", Third Edition, Pearson Education, 2006.
RajKamal, "Internet and Web Technologies", Tata McGraw-Hill.

List/Links of e-learning resource

https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-ee80/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in, Quiz/ Assignments, term work, end semester practical examination.

CO-PO Mapping:

Cos	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	2	1	2										1	1
CO-2	2	1	2										1	1
CO-3	2	1	2										1	2
CO-4	2	2	2										1	2
CO-5														

Suggestive list of experiments:

1. Design a web page to display your CV. CO1
2. Design a web page using HTML tags to take the input in a form and display it in another page/frame. CO1
3. Design a web page to isolate a part of the text that might be formatted in a different direction

from other text outside it. CO2
4. Create a Zebra Striping a Table and make an image rounded with CSS 3. CO2
5. Create speech bubble shape and image cross effect with CSS 3 transition. CO2
6. Using HTML, CSS create a styled check box with animation on state change. CO3
7. Using HTML, CSS create display an image overlay effect on hover. CO3
8. Using HTML, CSS create a list with floating headings for each section. CO3
9. Using HTML, CSS, Java Script create a typewriter effect animation. CO4
10. Using HTML, CSS create an animated under line effect when the user hover sover the text. CO4
11. Write a JavaScript program to set paragraph background color. CO4
12. Write a JavaScript function to add rows to a table. CO4
13. Write a JavaScript function that accepts arow, column (to identify a particular cell) and a string to update the cell & #39; s contents. CO5
14. Write a JavaScript program to highlight the bold words of the following paragraph, on mouse over a certain link. CO5
15. Write a JavaScript program to get the window width and height (anytime the window is resized). CO5

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	Department of IT
Subject handled by department	Department of IT

28/05

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA (M.P.)
(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF IT

Semester/Year	IV/II	Program		B. Tech– Information Technology			
Subject Category	DC	Subject Code:	IT-401	SubjectName	Computer Network		

Maximum Marks Allotted							Total Marks	Contact Hours			Total Credits
Theory				Practical				L	T	P	
ES	MS	Assignment	Quiz	ES	LW	Quiz	150	3	0	2	4
60	20	10	10	30	10	10					

Prerequisites:

Student having fundamental knowledge of analogue and digital communication, operating system and data structure.

Course Objective:

- Have fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area.
- Be familiar with various types of computer networks.
- Understand the concepts of Network Layer, Transport Layer, Application Layer

UNITs	Descriptions	Hrs.
I	Computer Network: Definitions, goals, components, structure, Architecture, Classifications & types, Growth, Complexity and applications etc. Layered Architecture: Protocol hierarchy, Connection Oriented & Connectionless Services, Service primitive Design issues & its functionality. ISO-OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization	8
II	Transmission Media, Sources of transmission impairment. Network Topology: Mesh, Bus, Star, Ring, Tree, etc. Standards Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three-layer switches & Gateway.	8
III	Data Link Layer: Need, Services Provided, Framing & its methods, Flow Control, Error control. DLL Protocol: Elementary & Sliding Window. Piggy backing & Pipelining. MAC Sublayer: Static & Dynamic channel allocation, Media access control for L AN & WAN. Collision free & limited contention protocol ALOHA: pure, slotted CSMA, CSMA/CD, CSMA/CA, IEEE802 standards for LAN & MAN & their comparison.	8
IV	Network Layer: Need, Services Provided, Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing Strategies, Congestion Control Algorithms: General Principles of Congestion control, Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram subnets. Comparison of IPv4 &IPv6, Mobile IP	8
V	Processes to Processes Delivery: Transmission Control Protocol (TCP)–User Datagram Protocol, Data Traffic, Congestion Control and Quality of Service, Techniques to improve QOS, Integrated Services, and Differentiated Services, DNS, SMTP, FTP, HTTP, WWW, Virtual Terminal Protocol, VoIP: Basic IP Telephone System.	8
Total Hours		40

Course Outcomes:

CO1: Develop a fundamental understanding of network design principles and structure of computer network.
CO2: Explain the importance of data communications, how communication works in data networks and the internet, recognize the different internetworking devices and their functions.
CO3: Explain the role of protocols in networking, Analyze the role and services and features of the various layers of data networks.
CO4: Analyze the features and operations of various routing protocols such as Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing.
CO5: Describe and examine working of Transport Layer and Application Layer protocol.

Text Books

1. Tanenbaum A.S, "Computer Networks", Pearson Education,4* Edition
2. William Stallings, "Data and Computer Communications", PHI 6* Edition.

Reference Books-

1. Douglas E. Comer," Computer Network & Internet", Pearson Education, 6ª Edition.
2. Behraj A Forouzan," Data Communication & Networking", Mc Graw-Hill, 4ª edition.
3. Natalia Olifer & Victor Olifer," Computer Networks", Willey Pub.
4. Prakash C. Gupta, "Data Communications and Computer Networks", PHI,2endedition.
5. Gallo," Computer Communication & Networking Technologies", Cengage Learning. 1stedition.

List/Links of e-learning resource

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/ Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2											3	
CO-2	3	3			1								2	
CO-3	3	3	1		1							3		3
CO-4	3	3	2	1								1		3
CO-5	3	3										1	2	

Suggestive list of experiments:

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
2. Study of Network Devices in detail.
3. Demonstrate single parity bit for error detection.
4. To understand error detection and correction technique Implement hamming code.
5. To understand error detection technique, Implement CRC.
6. To understand working of framing method Implement bit stuffing with start and end flag.
7. To understand farming methods, implement character count farming method.
8. To study and understand network IP.
9. Connect the computer in local Area Network.

Recommendation by Board of studies on	
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Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year		IV/II	Program		B. Tech – Information Technology
Subject Category	DC	Subject Code:	IT- 402	Subject Name	**Database Management System**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Basic Knowledge of Mathematics and Programming

Course Objective:

- To understand the different issues involved in the design and implementation of a database system.
- To represent a database system using ER diagrams and to learn normalization techniques
- To learn the fundamentals of data models, relational algebra, and SQL.
- To understand the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques

UNITs	Descriptions	Hrs.
I	Introduction: Purpose of Database System — Views of data – data models, database management system, three-schema architecture of DBMS, components of DBMS. E/R Model - Conceptual data modeling - motivation, entities, entity types, attributes relationships, relationship types, E/R diagram notation, examples.	6
II	Relational Model: Relational Data Model - Concept of relations, schema-instance distinction, keys, referential integrity and foreign keys, relational algebra operators, SQL - Introduction, data definition in SQL, table, key and foreign key definitions, update behaviors. Querying in SQL, notion of aggregation, aggregation functions group by and having clauses.	8
III	Database Design: Dependencies and Normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, definitions of 1NF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, algorithms for 3NF and BCNF normalization, 4NF, and 5NF.	9
IV	Transactions: Transaction processing and Error recovery - concepts of transaction processing, ACID properties, concurrency control, locking based protocols for CC, error recovery and logging, undo, redo, undo-redo logging and recovery methods.	9
V	Implementation Techniques: Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.	8
Total Hours		40

Course Outcomes:

CO-1: Understand the basic concepts, principles and applications of database systems.
CO-2: Discuss the components of DBMS, data models, Relational models.
CO-3: Use knowledge to find the functional dependencies and differentiate between different normal forms.
CO-4: Execute transaction concepts and concurrency protocols
CO-5: Articulate the basic concept of storage and access techniques.

Text Books-

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education
2. Silberschatz, Korth, "Data base System Concepts", 7th ed., McGraw hill.

Reference Books-

3. C. J. Date, "An Introduction to Database Systems", 8th ed., Pearson.
4. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems McGraw Hill.
5. Peter Rob and Carlos Coronel, Database System- Design, Implementation and Management, Cengage Learning.

List/Links of e-learning resource

- https://nptel.ac.in/courses/106/104/106104135/
- https://nptel.ac.in/courses/106/106/106106220

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

CO_s	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	3	2	2										1	2
CO-3	2	1	2		2								1	2
CO-4	2	1	2											2
CO-5	2	2	2											1

Suggestive list of experiments:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables
3. Write a sql statement for implementing ALTER, UPDATE and DELETE
4. Write the queries to implement the joins
5. Write the query for implementing the aggregate functions
6. Write the query to implement the concept of Integrity constraints
7. Write the query to create the views
8. Perform the queries with group by and having clauses
9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints
10. Write the query for creating the users and their role

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Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year	IV/II	Program	B.Tech - Information Technology
Subject Category: DC	Subject Code: IT-403	Subject Name	Automata and Compiler Design

Maximum Marks Allotted

Theory				Practical			Total Marks	Contact Hours			Total Credits
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:
Formal Languages and Automata Theory, Graph Theory

Course Objective:

- This course aims at introducing the major concepts of language translation and phases of compiler, besides the techniques used in each phase
- The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

UNITs	Descriptions	Hrs.
I	Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.	8
II	Compiler Structure: Compilers and Translators, Various Phases of Compiler, Symbol Table management Error Detection and Recovery, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis. The Syntactic Specification of Programming Languages: CFG, Chomsky hierarchy, Derivation and Parse tree, Ambiguity, Capabilities of CFG.	9
III	Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers. Bottom–up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC.	9
IV	Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.	6
V	Run Time Memory Management: Static and Dynamic storage allocation, stack-based memory allocation schemes. Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.	8
Total Hours		40

Course Outcomes:

CO1: Explain finite state machines for modeling and their power to recognize the languages.
CO2: Understand the functionality of parsing mechanisms.
CO3: Construct syntax trees and generate intermediate code
CO4: Understand the concepts of storage administration for different programming environments.
CO5: Understand the concepts of optimization and generate the machine code.

Text Books-

1. Louden, "Compiler construction", Cengage learning.
2. Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa.

Reference Books-

1. A.V. Aho, R. Sethi and J.D Ullman, "Compiler: principle, Techniques and Tools", AW.
2. Michal Sipser, "Theory of Computation", Cengage learning. □ H.C. Holub, "Compiler Design in C", Prentice Hall Inc.
3. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education.
4. K.L.P. Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata, Languages and Computation", PHI

List/Links of e-learning resource

1. https://www.udemy.com/course/formal-languages-and-automata-theory/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	2	3	3	2	2							3	2	2
CO-2	2	2	3	2								2		
CO-3	2	2	3	2	1							2	2	2
CO-4	3	3	1									1	2	
CO-5	3	3	3	2	3									

Suggestive list of experiments:

1. Write a program to construct DFA for regular valid identifier in C.
2. Write a program to construct DFA for regular expression a+.
3. Write a C program to identify whether a given line is a comment or not.
4. Case study of JFLAP (Formal Languages and Automata Package) tool for Finite automata.
5. Exercise on JFLAP tool for Regular Expression.
6. Exercise on JFLAP tool for NFA to DFA conversion.
7. Download and analyze the LEX/FLEX Tool.
8. Write a C Program to find first sets of particular Grammar.
9. Write a C Program to find follow sets of particular Grammar.
10. Write a Program to find leading and trailing symbols of operator precedence Grammar.

Recommendation by Board of studies on	
Approval by Academic council on	
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Subject handled by department	Department of IT

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year	IV/II	Program	B. Tech – Information Technology
Subject Category: DC	Subject Code: IT-404	Subject Name	Software Engineering

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
ES	MS	Assignment	Quiz	ES	LW	Quiz					
60	20	10	10	--	--	--	100	3	1	0	4

Prerequisites:
Fundamental knowledge of system, analysis and design

Course Objective:

2. To introduce students to the basic concepts, testing techniques and applications of Software Engineering
3. To provide a brief, hands-on overview of software development life cycle.
4. Develop and write a software project proposal.
5. Develop and write a Software Requirements Specification.
6. To understand and apply the various phases of software development like information gathering, feasibility, Process model, analysis, design, Estimations, quality, risk, maintenance, reengineering.

UNITs	Descriptions	Hrs.
I	Introduction to Software and Software Engineering The Evolving Role of Software, Software: Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Incremental Model, Spiral, Evolutionary Process Models, Agile Process Model, Component-Based Development, the capability maturity model integration (CMMI), ISO 9000 Models.	8
II	Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document. Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management. System models: Context models, behavioral models, data models, object models, structured methods.	6
III	Software Project Planning, Design Methodologies and Software Metrics, Software Project Planning: Project planning objectives, Decomposition Techniques, Empirical estimation models, Software Project Estimation Models, CPM/PERT. Design concept: Design Principles, Abstractions, refinement modularity, effective modular design, Cohesion & Coupling, Design notation, and specification, structure design methodologies, & design methods. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.	9
IV	Software Testing, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.	9
V	Software Maintenance and Software Reengineering, Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Adaptive,Corrective and Perfective Maintenance, Cost of Maintenance, Software Reengineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Risk management: Reactive vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM plan.	8
Total Hours		40

Course Outcomes:

CO-1: Interpret and justify different software development life cycle models.
CO-2: Understand the requirement analysis and identify state & behavior of real world software projects.
CO-3: Use various design methodologies to derive solutions for software project.
CO-4: Evaluate and quantify the quality of software though evaluation metrics.
CO-5: Identify and analyse the risk in development. CO-5: Evaluate different testing methods for software project management.

Text Books-

1. Roger S. Pressman, "Software Engineering — A Practitioner's Approach", Seventh Edition, McGraw-Hill International Edition,2010.
2. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited.

Reference Books-

1. Pankaj Jalote "Software Engineering" Narosa Publications.
2. Ian Sommerville: Software Engineering 6/e (Addison-Wesley).
3. Richard Fairley: Software Engineering Concepts (TMH).
4. Hans Vans Vilet, "Software Engineering Principles and Practice", Wiley.
5. Srinivasan Desikan and Gopalaswamy: Software Testing, Principle.

List/Links of e-learning resource

https://onlinecourses.nptel.ac.in/noc23_cs122/preview

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	1	1								2	3	1
CO-2	3	2	3	2								3	2	
CO-3	3	2	1	3	2							2	2	2
CO-4	2	3	2	2			3						2	2
CO-5	2	2	1									3	1	2

Suggestive list of Design Methodology & Tools:

1. Develop requirements specification for a given problem (The requirements specification should include both functional and non-functional requirements. For a set of about 10 sample problems.
2. Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem.
3. Develop UML Use case model for a sample problem.
4. Develop Sequence Diagrams.
5. Develop Class diagrams.
6. Use testing tool such as junit
7. To compute cyclomatic complexity for any flow graph.
8. Using configuration management tool-libra.
9. Use CPM/PERT for scheduling the assigned project.
10. Use Gantt Charts to track progress of the assigned project.

Recommendation by Board of studies on	
Approval by Academic council on	
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Subject handled by department	Department of IT

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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year	IV/II	Program	B. Tech – Information Technology
Subject Category: DC	Subject Code: IT-405	Subject Name	Information Theory & Coding

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	1	-	4

Prerequisites:

Knowledge of Communication System.

Course Objective:

- The purpose of the course is to teach the fundamental principle of Information Theory.
- To introduce the concepts of Channel and their capacity.
- To equip students with fundamental knowledge of Encryption and Decryption.

UNITs	Descriptions	Hrs.
I	Introduction to uncertainty, information, entropy and its properties, entropy of binary memoryless source and its extension to discrete memory-less source, coding theorem, prefix coding, HUFFMAN coding, Lempel-Ziv Coding, data compression, Binary image compression schemes, run length encoding, CCIIT group 3 and 4 compression.	7
II	Discrete memory less channels, Binary symmetric channel, mutual information & its properties, channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channel capacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practical communication system in light of Shannon's theorem.	7
III	Linear Block Codes, Systematic codes, syndrome and error detection, error detecting and correcting capabilities of block codes, Probability of undetected error for linear block code in BSC, Hamming codes and their applications.	7
IV	Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding & decoding circuits, syndrome computation & error detection, Introduction to BCH codes, its encoding & decoding error location & correction. Introduction to convolution codes, its construction, Viterbi algorithm for maximum likelihood decoding.	7
V	Video image compression and algorithms, Cryptography, encryption, decryption, cryptogram, crypto analysis, Concept of cipher,	7
Total Hours		35

Course Outcomes:

CO-1: Explain the fundamentals of Information Theory.

CO-2: Apply various techniques for channel capacity.

CO-3: Define, formulate and analyze various techniques for Block Codes

CO-4: Analyze different techniques for Cyclic Codes

CO-5: Understand the fundamentals of Cryptography.

Text Books-

1. Digital Communication by Haykins Simon Wiley Publ.
2. Error control Coding: Theory and Application, by Shu Lin and Costiello, PHI

Reference Books-

1. Medem analog and Digital Communication system, by B.P. Lathi
2. Digital Communication by Sklar Pearson Education

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	2	2	2										1	2
CO-3	2	1	2										1	2
CO-4	2	1	2											2
CO-5	2	2	1										1	2

Recommendation by Board of studies on	
Approval by Academic council on	
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Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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DEPARTMENT OF IT

Semester/Year	IV/II	Program	B. Tech- Information Technology
Subject Category: **DL**	Subject Code: **IT-406**	SubjectName	**Advanced Java Programming**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
				30	10	10	50	0	0	4	2

Prerequisites:

Fundamentals of Computing and Programming, Object Oriented Programming Using C++.

Course Objective:

- To introduce and understand students to programming concepts and techniques using the Java language and programming environment, class and objects.
- To learn about lifetime, scope and the initialization mechanism of variables and improve the ability general problem-solving abilities in programming.
- Be able to use the Java SDK environment to create, debug and run simple Java program

UNITs	Descriptions	Hrs.
I	Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes.	7
II	Java Collective Framework- Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: sort, shuffle, reverse, fill, copy, max and min, binary Search, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Unmodifiable Collections.	7
III	Advance Java Features - Multithreading: Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a WebServer, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC.	7
IV	Advance Java Technologies - Servlets: Overview and Architecture, Handling HTTP and HTTPs, get Requests, Using JDBC from a Servlet, Java Server Pages (JSP): First JSP Example, JSP elements, JSP tag library, Session tracking, Java Cryptographic architecture (JCA).	7
V	Advance Web/Internet Programming (Overview): Struts- Basics of MVC, architecture, action class, interceptors, tag library, validations, Hibernate-basics, architecture, CRUD, Spring-framework introduction.	7
Total Hours		35

Course Outcomes:

CO1: Use the syntax and semantics of java programming language and basic concepts of OOP.
CO2: Write basic Java applications and use arrays.
CO3: Develop reusable programs using the concepts of RMI and JDBC.
CO4: Apply the concepts of Servlet and JSP using advanced tools.
CO5: Design event driven GUI and web related applications which mimic the real-world scenarios.

Text Books-

1. E. Balaguruswamy, "Programming in Java"; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH

Reference Books-

1. Deitel &Deitel," JAVA, HowtoProgram"; PHI, Pearson
2. Cay Horstmann, Big JAVA, Wiley India
3. Merlin Hughes, et al; Java Network Programming, Manning Publications/ Prentice Hall

List/Links of e-learning resource

- https://archive.nptel.ac.in/courses/106/105/106105191/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	2	2	2										1	2
CO-2	2	2	2										1	2
CO-3	2	1	2	1									1	2
CO-4	2	1	2	1										2
CO-5	2	2	1	1									1	2

Suggestive list of experiments:

1. Installation of JDK. CO1
2. Write a program to show Scope of Variables. CO1
3. Write a program to show Concept of CLASS in JAVA. CO1
4. Write a program to show Type Casting in JAVA. CO2
5. Write a program to show How Exception Handling is in JAVA. CO2
6. Write a Program to show Inheritance. CO2
7. Write a program to show Polymorphism. CO3
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA. CO3
9. Write a program to show use and Advantages of CONSTRUCTOR. CO3
10. Write a program to show Interfacing between two classes. CO4
11. Write a program to Add a Class to a Package. CO4
12. Write a program to show LifeCycle of a Thread. CO4
13. Write a program to demonstrate AWT. CO4
14. Write a program to Hide a Class. CO4
15. Write a Program to show Data Base Connectivity Using JAVA. CO5
16. Write a Program to show "HELLO JAVA" in Explorer using Applet. CO5
17. Write a Program to show Connectivity using JDBC. CO5
18. Write a program to demonstrate multithreading using Java. CO5
19. Write a program to demonstrate applet lifecycle. CO5
20. Write a program to demonstrate concept of servlet. CO5

Recommendation by Board of studies on	
Approval by Academic council on	
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Subject handled by department	Department of IT