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	Quiz/Assignment	End Sem	Lab-Work		L	T	P	
60	20	20	30	20	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

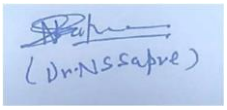
Evaluation will be continuous as an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and viva of each candidate.

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

Dr J Parashar
Dean, Academics
SATI, Vidisha

Dr Manoj Datar
Prof & Head, Chemistry
SATI, Vidisha

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of IT

Semester/Year			Program		B.Tech.-IT
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)

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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	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	IT
Subject handled by department	IT

Dr. Kanak Saxena
Chairperson

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
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Department of Humanities and Management

Semester/Year		I/II	Program		B.Tech.
Subject Category	Hum	Subject Code:	HUB102	Subject Name:	**Communication and Report Writing**

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	-	-	-	100	3	1	0	4

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-

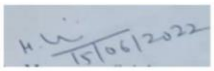
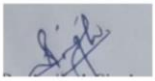
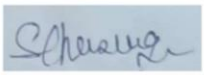
1. A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH Pub Sanjay Kumar PushpLata, English for Effective Communication, Oxford.

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
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Department of IT

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	150	2	0	2	3

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

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	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	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	IT
Subject handled by department	IT

Dr. Kanak Saxena
Chairperson

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	Departmental Core	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	Assignment	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**

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:

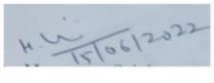
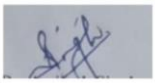
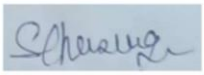
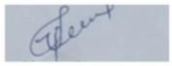
1. By the end of the course, students will become aware of themselves, and their surroundings (family, society, nature)
2. They would have better critical ability.
3. They would become more responsible in life; and keeping human relationships and human nature in mind will be able to handle problems with 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	BS	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	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

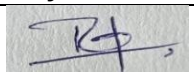
Assignments, Quiz, Tests & exams

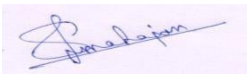
Criteria	**Excellent (3 points)**	**Good (2 points)**	**Fair(1 point)**
Quiz	> 80%	60-80%	40-60%
Test & exam	>75%	60 -75%	< 60%
Assignment	Assignment is coherently organized and the logic / solution to all the problems provided. Writing is clear and concise and persuasive.	Assignment is generally well 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

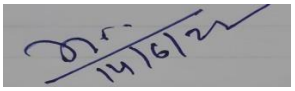
List/Links of e-learning resource

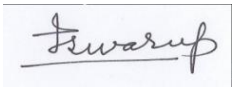
- https://nptel.ac.in/courses/122107035/#
- https://nptel.ac.in/course.html
- http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf
- https://physicstoday.scitation.org
- Barbastathis, G. and Sheppard C., Optics, https://ocw.mit.edu/courses/mechanical-engineering/2-71-optics-spring-2009/

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 IT

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	

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Chairperson

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	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	Dr. Sandeep Raghuwanshi
Subject handled by department	Department of IT

Dr. Kanak Saxena
Chairperson

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

Department of IT

Semester/Year			Program		B.Tech.
Subject Category	ESC	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.

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Chairperson

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	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	Department of IT
Subject handled by department	Department of IT

Dr. Kanak Saxena
Chairperson

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

Department of IT

Semester/Year	II/I	Program		B.Tech
Subject Category: ESC	Subject Code:	CSA104	Subject Name:	Principle 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, Designof 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

Dr. Kanak Saxena
Chairperson

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	14.06.2022
Approval by Academic council on	
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)

Department of Applied Science

Semester/Year		Second/First	Program		B. Tech.
Subject Category	Departmental Core	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	Assingment	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

Dr. Kanak Saxena
Chairperson

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

Department of IT

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

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

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Chairperson

	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	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	Department of IT
Subject handled by department	Department of IT

Dr. Kanak Saxena
Chairperson

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 rise time, 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 ad FM frequency deviation, Bessel's function , spectrum and transmission BW of FM , NBFM,WBFM , phase diagram of FM signals in FM system s, 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_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

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
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(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-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. inbuilt 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 sub class, 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, "The Complete Reference Java 2", TataMcGraw Hill
- E Balaguruswamy, "Programming in Java", TMH Publications

Reference Books

- Deitel "Java-How to Program:" Pearson Education, Asia
- Horstmann & Cornell, "Core Java 2" (Vol I & II), Sun Microsystems
- Ivan Bayross, "java 2.0", 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 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	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.
2. Write a Java program to display the default value of all primitive data types of Java.
3. Write a program to give an example of control statements.
4. Write a program and give an example for command line arguments.
5. Write a program to create a room class, the attributes of this class is roomno, roomtype, roomarea and ACmachine. In this class the member functions are setdata and displaydata..
6. Write a program to create a class ‘simpleobject‘. Using the constructor display the message.
7. Write a program to give the example for ‘this’ operator. And also use the ‘this’ keyword as return statement.
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 .
9. Write a program to give an example of method overloading and overriding concepts.
10. Write a program to give a simple example for abstract class.
11. Write a program to give example for multiple inheritance in Java.
12. Write a program to illustrate usage of try/catch with finally clause.
13. Write a program to create two threads. In this class we have one constructor used to start the thread and run it. Check whether these two threads are run are not.

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
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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. s.	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 8 Queens'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 synchronisation 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 SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", Universities Press, 2nd edition (2008), ISBN-13: 978-8173716126.

Reference Books

- Thomas Cormen, Charles Leiserson, Ronald Rivest and Cliford Stein, "Introduction to Algorithms", PHI, 3rd edition, 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:

Q.1 Understand the working of Ubuntu operating system and basic commands for implementing Algorithm in c programming in Ubuntu operating system using gcc compiler.

Q.2 Write a simple c program to add two integer numbers.

Q.3 Implement factorial of given number using iteration method and recursive Method.

Q.4 Implement logic to swap two integer number using three different approach.

Q.5 Implement Algorithm to determine given number is divisible by 5 or not without using % Operator.

Q.6 Implement Algorithm to convert binary number to decimal number without using array and Power function.

Q.7 Implement Algorithm to print reverse of string using recursion and without using characterArray.

Q.8 Implement Linear Search Algorithm.

Q.9 Implement Binary Search Algorithm (By using Iterative Approach)

Q.10 Implement Binary Search Algorithm (By using Recursive Approach)

Q.11Implement Insertion Sort Algorithm

Q.12 Implement Quick Sort Algorithm (By using Recursive Approach)

Q.13 Implement Quick Sort Algorithm (By using Non Recursive Approach). Q.14 Implement Merge Sort Algorithm. Q.15 Implement Heap Sort Algorithm.	
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)
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, micro program example, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program 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-processor arbitration, inter-processor 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-

2. John D. Carpinelli, "Computer Systems Organization and Architecture", Pearson, 1st Edition.
3. 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_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	
Compiled and designed by	
Subject handled by department	Department of IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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(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	**DL**	**Subject Code:**	**IT-306**	**Subject Name**	**Internet 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:

Fundamental knowledge of programmings.

Course Objective:

Understand static and dynamic web pages.

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	Java Script: 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 web page 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.
Raj Kamal, "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_1**	**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.
2. Design a web page using HTML tags to take the input in a form and display it in another page/frame.
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 4. Create a Zebra Striping a Table and make an image rounded with CSS3. 5. Create speech bubble shape and Image cross effect with CSS3 transition. 6. Using HTML, CSS create a styled checkbox with animation on state change. 7. Using HTML, CSS create display an image overlay effect on hover. 8. Using HTML, CSS create a list with floating headings for each section. 9. Using HTML, CSS, JavaScript create a typewriter effect animation. 10. Using HTML, CSS create an animated underline effect when the user hovers over the text. 11. Write a JavaScript program to set paragraph background color. 12. Write a JavaScript function to add rows to a table. 13. Write a JavaScript function that accepts a row, column (to identify a particular cell) and a string to update the cell's contents. 14. Write a JavaScript program to highlight the bold words of the following paragraph, on mouse over a certain link. 15. Write a JavaScript program to get the window width and height (any time the window is resized).

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
(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**		Subject Name	**Computer Network**				
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:

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. Piggybacking & Pipelining. MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN.Collision free & limited contention protocolALOHA : pure, slotted CSMA, CSMA/CD,CSMA/CA, IEEE 802 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 , 4th Edition
2. William Stallings, “Data and Computer Communications”, PHI 6th Edition .

Reference Books-

1. Douglas E. Comer ,”Computer Network & Internet”, Pearson Education, 6th Edition.
2. Behraj A Forouzan,”Data Communication & Networking”, McGraw-Hill,4th edition.
3. Natalia Olifar& Victor Olifer,”Computer Networks”, Willey Pub.
4. Prakash C. Gupta, “Data Comunications and Computer Networks”, PHI,2end edition.
5. Gallo,”Computer Communication & Networking Technologies”,Cengage Learning.1st edition.

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	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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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. RamezElmasri 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:

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	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

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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								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:

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_1	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 forFinite 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.

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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-404	Subject Name	Software Engineering

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	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, "Soflware 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. PankajJalote "Software Engg" 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. SrinivasanDesikan 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_1	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 cyclometic 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.

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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	**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 Cyptography.

Text Books-

1. Digital Communication by Haykins Simon Wiley Publ.
2. Error control Coding: Theory and Application, by Shu Lin and Cosstiello,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	
Compiled and designed by	
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**	Subject Name	**Advanced Java Programming**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
				60	20	20	100	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 Frame Work - 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 Web Server, 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 word scenarios.

Text Books-

1. E. Balaguruswamy, “Programming In Java”; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH

Reference Books-

3. Deitel&Deitel, ”JAVA, How to Program”; PHI, Pearson
4. Cay Horstmann, Big JAVA, Wiley India
5. 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_1	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.
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONSTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show “HELLO JAVA ” in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

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
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(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF IT

Semester/Year	V/III	Program	B.Tech – IT
Subject Category: DC	Subject Code: IT 501	Subject Name	Mobile Application Development

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 programming skills.

Course Objective:

1. To facilitate students to understand android SDK.
2. To help students to gain a basic understanding of Android application development.
3. To inculcate working knowledge of Android Studio development tool

UNITs	Descriptions	Hrs.
I	Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.	8
II	Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.	8
III	Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.	8
IV	Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	8
V	Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.	8
Total Hours		40

Course Outcomes:

CO1: Identify various concepts of mobile programming that make it unique from programming for other platforms**.**
CO2: Critique mobile applications on their design pros and cons.
CO3: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
CO4: Program mobile applications for the Android operating system that use basic and advanced phone features.
CO5: Deploy applications to the Android marketplace for distribution.

Text Book & Reference Books-

1. T1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011).
2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
3. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd.
4. Android Application Development All in one for Dummies by Barry Burd, Edition.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

1. Develop an application that uses GUI components, Font and Colours.
2. Develop an application that uses Layout Managers and event listeners.
3. Write an application that draws basic graphical primitives on the screen.
4. Develop an application that makes use of databases.
5. Develop an application that makes use of Notification Manager.
6. Implement an application that uses Multi-threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that makes use of RSS feed.
11. Develop a mobile application to send an email.

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
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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT					
Subject Category	DC	Subject Code:		IT 502	Subject Category	Wireless & Mobile Computing					
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks Quiz				Theory Quiz
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

- Basic concept of Communication systems.
- Basic knowledge of programming skills.

Course Objective:

1. To provide an overview of Wireless Communication networks area and its applications in communication engineering.
2. To introduce various standards of mobile communication.
3. To explain the various terminology, principles, devices, schemes, concepts used in Wireless Communication Networks.
4. To introduce the concepts of Adhoc networks and Sensor networks and their issue
5. To introduce various security threats in wireless networks and the techniques for the prevention and detection of threats

UNITs	Descriptions	Hrs.
I	Antenna , radiation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propagation effects, handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process.	8
II	GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.	8
III	IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.	8
IV	Mobile IP, DHCP, Ad hoc networks: Characteristics,	8

	performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP.	
V	Intruders, Intrusion detection, password management, viruses and related threads, worms, trojan horse defense, difference biometrics and authentication system, firewall design principle.	8
Total Hours		40

Course Outcomes:

CO1: Explain the basic concepts of wireless network and wireless generations.
CO2: Demonstrate the different wireless technologies such as CDMA, GSM, GPRS etc
CO3: Explain the design considerations for deploying the wireless network infrastructure.
CO4: Appraise the importance of Adhoc networks such as MANET and Wireless Sensor networks
CO5: Differentiate and support the security measures, standards. Services and layer wise security considerations.

Text Book & Reference Books-

1 J. Schiller, "Mobile Communication", Addision , Wiley.
2 William Stalling, "Wireless Communication and Network", Pearson Education.
3 Upena Dalal," Wireless Communication", Oxford Higher Education.
4 Dr. Kamilo Feher, "Wireless Digital communication", PHI.
5 William C.Y Lee, "Mobile Communication Design Fundamental" , John Wiley.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_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. To implement mobile network using open source softwares like NS2 etc.
2. Implement Code Division Multiple Access (CDMA).
3. To write a programme to implement concept of frequency reuse when given size of geographical area and the set of available frequencies.
4. Study of OPNET tool for modeling and simulation of different cellular standards.
5. Study and Analysis of wired network.
6. Study and Analysis of wireless network.
7. Study and Analysis of Bluetooth.
8. Study of Mobile IP.
9. Write programs using WML (Wireless Markup Language)

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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DEPARTMENT OF IT

Semester/Year		V/III	Program		B.Tech -IT
Subject Category	DC	Subject Code:	IT 503	Subject Name	Artificial Intelligence

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 algorithms, Discrete Mathematics.

Course Objective:

1 Identify problems that are amenable to solution by AI methods, and which AI methods maybe suited to solving a given problem.
2. Review of classical problem solving: search and forward and backward chaining.
3. Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem etc.

UNITs	Descriptions	Hrs.
I	Definitions – Foundation and History of AI, Evolution of AI - Applications of AI, Classification of AI Systems with respect to environment. Artificial Intelligence vs Machine learning, Tic - Tac – Toe problem. Intelligent Agent: Concept of Rationality, nature of environment, structure of agents.	8
II	Heuristic Search Techniques: Generate-and-Test; Hill Climbing; Properties of A* algorithm, Best first Search; Problem Reduction. Constraint Satisfaction problem: Interference in CSPs; Back, tracking search for CSPs; Local Search for CSPs; structure of CSP Problem. Beyond Classical, Search: Local search algorithms and optimization problem, local search in continuous spaces, searching with nondeterministic action and partial observation, online search agent and unknown environments.	10
III	Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	12
IV	Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques. Natural Language Processing Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing. Hopfield Network, Learning in Neural Networks, Application of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI and Symbolic AI.	8
V	Developments Process, knowledge Acquisition. PROLOG	8

	Introduction, Syntax and Numeric Function, Basic List Manipulation, Functions, Predicates and Conditional, input, output and Local Variables, iteration and Recursion, Property Lists and Arrays, LISP and other AI Programming Languages.	
Total Hours		45

Course Outcomes:

CO1: Describe various searching methods and reasoning in AI.
CO2: Uses of Knowledge Representation Techniques.
CO3: Analysis the concepts of reasoning and planning
CO4: Illustrate the concept of NLP and NN
CO5: Apply and evaluate AI Techniques using PROLOG and LISP

Text Book & Reference Books-

1. Artificial Intelligence -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill.
2. Introduction to Prolog Programming By Carl Townsend.
3. Programming with PROLOG —By Klocksin and Mellish.
4. Artificial Intelligence (Fifth Edition) -By George F Luger, Pearson Education.
5. Artificial Intelligence (Second Edition}-By Stuart Russell and Peter Norvig, Pearson Education.
6. Artificial Intelligence Application Programming, Tim Jones, Wiley India
7. Artificial Intelligence And Expert Systems - By D.W Patterson

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_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							2	2	2
CO-4		2	3	3								3	3	3
CO-5		3	2	3								3	3	3

Suggestive list of experiments:

1. Write a program to solve 8 queens problem
2. Solve any problem using depth first search.
3. Solve any problem using best first search.
4. Solve 8-puzzle problem using best first search
5. Solve travelling salesman problem.
6. Write a program to solve the Monkey Banana problem

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DEPARTMENT OF IT

Semester/Year	V/III	Program	B.Tech – IT
Subject Category: DE	Subject Code: IT 504 (A)	Subject Name	Block chain Technology

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:

Basic Knowledge of mathematics.

Course Objective:

1) Technology behind blockchain
2) Emerging trends in blockchain .
3) Real-world applications of block chain

UNITs	Descriptions	Hrs.
I	Introduction to Blockchain Technology: Basic ideas behind block chain, how it is changing the landscape of digitalization, introduction to cryptographic concepts, Hashing, public key cryptosystems, private vs public block chain and use cases, Hash Puzzles	8
II	Blockchain Fundamentals: Basic architecture of Blockchain, different terminologies associated, Characteristics of Block chain, Types of networks, Introducing Smart contract concept in Blockchain.	8
III	Components of Blockchain: Core components of Blockchain, Types of Block chains; Blockchain Protocol, Permission & Permission less Block chains,	8
IV	Digital Ledger: Short History of Money and Trust, Bitcoin Mechanics, Introduction to Ethereum, Introduction to Hyperledger, Hyperledger Fabric and its architecture, Hyperledger Composer Emerging Trends in Blockchain: Cloud-based block chain, Multi chain, Geth , Stellar , Ripple, R3 Corda, Blockchain API, Blockchain Sandboxes	8
V	Block Chain Use Cases: Supply Chain Management, Finance, Health Care, Internet of Things (IoT), Remittance, Land Records, Voting and election, Loyalty Programs, Go Green (Renewable Energy)	8
Total Hours		40

Course Outcomes:

CO-1: Understand the basic concepts, principles and applications of block chain.
CO-2: Understand basic architecture of Block chain, Characteristics of Block chain.
CO-3: Explain Core components of Block chain, Types of Block chains; Blockchain Protocol.
CO-4: Compare the working of different block chain platforms.
CO-5: Analyse the importance of block chain in finding the solution to the real-world problems

Text Book & Reference Books-

1. Artemis Caro, —Blockchain: The Beginners Guide to Understanding the Technology BehindBitcoin& Crypto currency‖.

2. Scott Marks, —Blockchain for Beginners: Guide to Understanding the Foundation and Basics of the Revolutionary Blockchain Technology‖, Create Space Independent Publishing Platform.

3. Mark Watney, —Blockchain for Beginners.

4. Alwyn Bishop, —Blockchain Technology Explained.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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		VI/III		Program		B.Tech – IT					
Subject Category	DE	Subject Code:	IT 504 (B)	Subject Name	Digital Image Processing						
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:

Knowledge of Computer Programming Language and MATLAB

Course Objective:

A) To study the image fundamentals and mathematical transforms necessary for image processing.
B) To study the image enhancement techniques.
C) To study image restoration procedures.
D) To study the image compression procedures.

UNITs	Descriptions	Hrs.
I	Digital Image Fundamentals: A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.	8
II	Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8
III	Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8
IV	Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8
V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
Total Hours		40

Course Outcomes:

CO-1: Ability to apply principles and techniques of digital image processing in applications related to design and analysis of digital imaging systems. CO-2: Ability to analyze and implement image processing algorithms to real problems. CO-3: Gaining of hands-on experience in using software tools for processing digital images. CO-4: Interpret image segmentation and representation techniques. CO-5: Apply Mathematical Morphology using Polynomial approximation.

Text Book & Reference Books-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Sonka, Digital Image Processing & Computer Vision, Cengage Learning.
3. Jayaraman, Digital Image Processing, TMH.
4. Pratt, Digital Image Processing, Wiley India.
5. Annadurai, Fundamentals of Digital Image Processing,Pearson Education.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT					
Subject Category	DE	Subject Code:		IT 504 (C)	Subject Name	Natural Language Processing					
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:

Basic Knowledge of algorithms, Discrete Mathematics.

Course Objective:

1 Natural language processing deals with written text.
2 Learn how to process written text from basic of fundamental knowledge.
3 Regular expression and probabilistic model with n-grams.
4 Recognizing Speech and parsing with grammar

UNITs	Descriptions	Hrs.
I	Introduction to NLP: History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, build an NLP pipeline , Phases of NLP, NLP APIs, NLP Libraries.	8
II	Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical Comparison of Smoothing Techniques, Applications of Language Modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition	8
III	Words and Word Forms: Bag of words, skip-gram, Continuous Bag-OfWords, Embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation.	8
IV	Text Analysis, Summarization and Extraction: Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR.	8
V	Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models) using EM), Encoder-decoder architecture, Neural Machine Translation.	8
Total Hours		40

Course Outcomes:

CO1: Understand comprehend the key concepts of NLP and identify the NLP challenges and issues.
CO2: Develop Language Modeling for various text corpora across the different languages
CO3: Illustrate computational methods to understand language phenomena of word sense

disambiguation. CO4 : Design and develop applications for text or information extraction/summarization/classification.
CO5: Apply different Machine translation techniques for translating a source to target language(s).

Text Book & Reference Books-

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition Jurafsky, David, and James H. Martin, PEARSON "Designing the User Interface - Strategies for Effective Human Computer Interaction", by Ben Shneiderman ISBN: 9788131732557, Pearson Education (2010).

2.Foundations of Statistical Natural Language Processing, Manning, Christopher D., and Hinrich Schütze, Cambridge, MA: MIT Press.

3. Natural Language Understanding, James Allen. The Benjamin/Cummings Publishing.

4. Natural Language Processing with Python – Analyzing Text with the Natural Language ToolkitSteven Bird, Ewan Klein, and Edward Loper.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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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DEPARTMENT OF IT

Semester/Year		V/III	Program		B.Tech – IT
Subject Category	OC	Subject Code:	IT 505 (A)	Subject Name	Mobile Application Development

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:

Basic knowledge of programming skills.

Course Objective:

1. To facilitate students to understand android SDK.
2. To help students to gain a basic understanding of Android application development.
3. To inculcate working knowledge of Android Studio development tool

UNITs	Descriptions	Hrs.
I	Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.	8
II	Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.	8
III	Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.	8
IV	Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	8
V	Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.	8
Total Hours		40

Course Outcomes:

CO1: Identify various concepts of mobile programming that make it unique from programming for other platforms**.**
CO2: Critique mobile applications on their design pros and cons.
CO3: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
CO4: Program mobile applications for the Android operating system that use basic and advanced phone features.
CO5: Deploy applications to the Android marketplace for distribution.

Text Book & Reference Books-

5. T1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011).
6. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
7. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd.
8. Android Application Development All in one for Dummies by Barry Burd, Edition.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

5. Develop an application that uses GUI components, Font and Colours.
6. Develop an application that uses Layout Managers and event listeners.
7. Write an application that draws basic graphical primitives on the screen.
8. Develop an application that makes use of databases.
5. Develop an application that makes use of Notification Manager.
6. Implement an application that uses Multi-threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that makes use of RSS feed.
11. Develop a mobile application to send an email.

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)
DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT					
Subject Category	OC	Subject Code:		IT 505(B)	Subject Name	Analog and Digital Communication					
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:

Basic Knowledge of Signals and Systems, probability.

Course Objective:

(1) Understanding Analog communications systems with design and analysis of various basic modulation systems.
(2) Understanding Digital communications systems with design and analysis of various basic Digital modulation

UNITs	Descriptions	Hrs.
I	Introduction to Communication Systems – Modulation – Types – Need for Modulation. Theory of Amplitude Modulation – Evolution and Description of SSB Techniques – Theory of Frequency and Phase Modulation – Comparison of Analog Communication Systems. Generation and detection of AM and FM	8
II	Pulse Communication: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) – Comparison of various Pulse Communication System .Data Communication: History of Data Communication – Standards, Organizations for Data Communication- Data Communication Circuits – Data Communication Codes – Data communication Hardware – serial and parallel interfaces. Experiments on PAM, PPM, PWM, Sampling, PCM	8
III	Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK)– Phase Shift Keying (PSK) – BPSK – QPSK – Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System. Experiments on ASK,FSK,and PSK.	8
IV	Entropy, Source Encoding Theorem, Shannon Fano Coding, Huffman Coding, Mutual Information, Channel Capacity, Error Control Coding, Linear Block Codes, Cyclic Codes – ARQ Techniques Simulation of error control coding schemes.	8
V	Global System for Mobile Communications (GSM) – Code Division Multiple Access (CDMA) – Cellular Concept and Frequency Reuse – Channel Assignment and Handover Techniques – Overview of Multiple Access Schemes – Satellite Communication – Bluetooth. Simulation of Communication link	8
Total Hours		40

Course Outcomes:

CO-1: Analyze analog communication techniques.
CO2: Describe data and pulse communication systems.
CO-3: Demonstrate various digital communication techniques.
CO-4: Design and implement error control coding schemes.
CO-5: Utilize multi-user radio communication.

Text Book & Reference Books-

1. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004.
2. Rappaport T.S, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education,2007
3. H.Taub, D L Schilling and G Saha, "Principles of Communication", 3rd Edition, PearsonEducation, 2007.
4. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
5. B.Sklar,"Digital Communication Fundamentals and Applications"2nd EditionPearson Education2007

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5		1	2	3									2	

Suggestive list of experiments:

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		V/III	Program		B.Tech – IT
Subject Category	OC	Subject Code:	IT-505 (C)	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	--	--	--	100	3	0	0	3

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 rise time, 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 ad FM frequency deviation, Bessel's function , spectrum and transmission BW of FM , NBFM,WBFM , phase diagram of FM signals in FM system s, 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_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

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
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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT
Subject Category	DLC	Subject Code:	IT 506	Subject Category		IT Workshop (Matlab/Scilab)

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

Prerequisites:

Nil

Course Objective:

The student should be made:

- Familiar with the MATLAB GUI and basic tool boxes
- Exposed to vector and matrix operations
- Familiar with arithmetic, logical and relational operations on matrix
- To practice script, function files, graphs, conditional and iterative statements in MATLAB. in MATLAB.

UNITs	Descriptions	Hrs.
I	Introductory Sessions Of MATLAB Training Course, Why MATLAB, MATLAB Interface, Introduction To Arrays And Matrices, MATLAB File Types, Basics Of MATLAB Programming, Handling Data And Data Flow in MATLAB, Data Types, Creating Variables, Scalars, Vectors And Matrix Operations & Operators	8
II	Define and writing of Script Files, define and writing of Function Files	8
III	MATLAB Graphics, Simple Graphics & Types, Plotting Functions, Creating And Editing Plots (2D & 3D), Handling Graphics	8
IV	MATLAB Programming , Conditional Statements, Iterative Statements, Flow Control,	8
V	Efficient Coding Practices, Linear Algebra, Polynomials, Curve Fitting, Differentiation & Integration , Introduction To MATLAB Toolboxes	8
Total Hours		40

Course Outcomes:

the students will be able to

- Learn and understand about basic datatypes, variables, scalars in MATLAB.
- Write script and function files in MATLAB.
- Plot and handle different kind of graphs in MATLAB.
- Program conditional and iterative statements
- Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

Text Book & Reference Books-

Text Book

1. Rudra Pratap Singh, “Getting started with MATLAB”, Seventh Edition-Oxford.

Reference Books-

1. Holly Moore, “ MATLAB for Engineers” Third Edition – Pearson Publications
2. Stephen J. Chapman, “MATLAB Programming for Engineers” Fourth Edition – Thomson learning.

List/Links of e-learning resource

https://onlinecourses.nptel.ac.in/noc22_ma31/preview

- learn and understand about basic datatypes, variables, scalars in MATLAB.
- write script and function files in MATLAB.
- plot and handle different kind of graphs in MATLAB.
- Program conditional and iterative statements

  Learn to program curve fitting, differentiation in MATLAB and learn about MATLAB Toolboxes.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Quiz, 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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	1	3		3									
CO-2	3	1	3		3									
CO-3	3	1	3		3									
CO-4	3	1	3		3									
CO-5	3	1	3	1	3									

Suggestive list of experiments:

1. Introduction to SDK of MATLAB
2. Basic Syntax and scalar arithmetic operations and calculations
3. Working with formulas
4. Arithmetic operations in matrix data
5. Matrix operations (Inverse, Transpose)
6. Reading an image file
7. Reading from and writing to a text file
8. Introduction to toolboxes 9. Data visualization and plotting
10. Relational operators in data
11. Logical operation in data
12. Loops in MATLAB
13. Computing Eigen value for a matrix
14. Random number generation - Montecarlo methods

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
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DEPARTMENT OF IT

Semester/Year	VI/III	Program	B.Tech – IT
Subject Category: DC	Subject Code: IT 601	Subject Name	Data Mining and Warehousing

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 programming skills and data structures.

Course Objective:

1. To introduce data warehouse and its components.
2.To introduce knowledge discovery process, data mining and its functionalities
3.To develop understanding of various algorithms for association rule mining and their differences.
4. To introduce various classification techniques.
5. To introduce various clustering algorithms.

UNITs	Descriptions	Hrs.
I	Data Warehousing: Need for data warehousing , Basic elements of data warehousing, Data Mart, Data Warehouse Architecture, extract and load Process, Clean and Transform data, Star ,Snowflake and Galaxy Schemas for Multidimensional databases, Fact and dimension data, Partitioning Strategy-Horizontal and Vertical Partitioning, Data Warehouse and OLAP technology, Multidimensional data models and different OLAP Operations, OLAP Server: ROLAP, MOLAP, Data Warehouse implementation, Efficient Computation of Data Cubes, Processing of OLAP queries, Indexing data.	8
II	Data Mining: Data Preprocessing, Data Integration and Transformation, Data Reduction, Discretizaion and Concept Hierarchy Generation, Basics of data mining, Data mining techniques, KDP (Knowledge Discovery Process), Application and Challenges of Data Mining	8
III	Mining Association Rules in Large Databases: Association Rule Mining, Single Dimensional Boolean Association Rules, Multi-Level Association Rule, Apriori Algorithm, Fp- Growth Algorithm, Time series mining association rules, latest trends in association rules mining.	8
IV	Classification and Clustering: Distance Measures, Types of Clustering Algorithms, K-Means Algorithm, Decision Tree, Bayesian Classification, Other Classification Methods, Prediction, Classifier Accuracy, Categorization of methods, Outlier Analysis.	8
V	Introduction of Web Mining and its types, Spatial Mining, Temporal Mining, Text Mining, Security Issue, Privacy Issue, Ethical Issue.	8
Total Hours		40

Course Outcomes:

CO1: Demonstrate an understanding of the importance of data warehousing and OLAP technology.
CO2: Organize and Prepare the data needed for data mining using pre preprocessing techniques.
CO3: Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on various data sets
CO4: Define and apply metrics to measure the performance of various data mining algorithms
CO5: Demonstrate an understanding of data mining on various types of data like web data and spatial data.

Text Book & Reference Books-

1. Arun k Pujari "Data Mining Technique" University Press
2. Han,Kamber, "Data Mining Concepts & Techniques",.
3. M.Kaufman., P.Ponnian, "Data Warehousing Fundamentals", JohnWiley.
4. M.H.Dunham, "Data Mining Introductory & Advanced Topics", PearsonEducation.
5. Ralph Kimball, "The Data Warehouse Lifecycle Tool Kit", JohnWiley.
6. E.G. Mallach , "The Decision Support & Data Warehouse Systems", TMH

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

1. Data Processing Techniques: (i) Data Cleaning (ii) Data Transformation-Normalization (iii) Data Integration
2. Data Warehouse Schemas: Star, Snowflake, Fact Constellation
3. Data Cube Construction-OLAP operations.
4. Data Extraction, Transformations, Loading operations.
5. Implementation of Apriori algorithm
6. Implement an application that uses Multi-threading.
7. Implementation of FP-Growth algorithm.
8. Implementation of Decision Tree Induction.
9. Classification of data using Bayesian approach.
10. Classification of data using K-Nearest Neighbor approach 8.
11. Implementation of K-Means algorithm.

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
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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT					
Subject Category	DC	Subject Code:		IT 602	Subject Category	Web Application Development					
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks Quiz				Theory Quiz
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Course Objective:

1. To introduce concepts of designing web pages using HTML, CSS and Javascript.
2. To familiarize with JSP programming and XML.
3. To impart PHP programming and master database access using PHP and MySQL.

UNITs	Descriptions	Hrs.
I	**Introduction:** Concept of WWW, Internet and WWW **HTTP Protocol:** Request and Response, Web browser and Web servers, **Features of Web 2.0 Web Design:** Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Web site, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.	8
II	**HTML:** Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5	8
III	**Style sheets :** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2 **Overview and features of CSS3 JavaScript :** Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, **Advance JavaScript :** Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations **DHTML :** Combining HTML, CSS and Javascript, Events and buttons	8
IV	**XML :** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. **Transforming XML using XSL and XSLT PHP:** Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files **Advance Features :** Cookies and Sessions, Object Oriented Programming with PHP	8
V	**PHP and MySQL :** Basic commands with PHP examples,	8

	Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs	
Total Hours		40

Course Outcomes:

the students will be able to

- Understand the concept of WWW, Internet and Planning, designing and publishing of website.
- Understand and applying concepts of HTML.
- Design dynamic web pages using HTML, CSS and JavaScript.
- Understanding and Applying concept of XML.
- Connect to MySQL using PHP and perform various operations

Text Book & Reference Books-

Text Book

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

Reference Books-

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dremtech
2. Java Server Pages – Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W. Sebesta. Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

List/Links of e-learning resource

https://nptel.ac.in/courses/106106156

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2	3	1										
CO-2	3		3		3									
CO-3	3	2	3		3									
CO-4	3	2	3		3									
CO-5	3	2	3		3									

Suggestive list of experiments:

1. Design the following static web pages required for an online book store web site.
i. Home Page ii. Login Page iii. Catalogue Page

2. Design the following static web pages required for an online book store web site.
i. Registration Page ii. Cart Page

3. Design a web page using CSS which includes the following:
i. Use different font and text styles
ii. Set a background image for both the page and single element on the page.
iii. Define styles for links
iv. Working with layers
v. Adding a Customized cursor

4. i. Write a JavaScript to validate the fields of the login page.
ii. Write a JavaScript to validate the fields of the Registration page

5. Write an XML file which will display the Book information which includes the following: Title of the book, Author Name, ISBN number, Publisher name, Edition and Price. Validate the above document using DTD and XML Schema.

6. i. Write a PHP program to validate the fields of the login page.
ii. Write a PHP program to validate the fields of the Registration page

7. Write a JSP to connect to the database and extract data from the tables and display them to the user.

8. Design a JSP to insert the details of the users who register through the registration page and store the details in to the database.

9. Write a PHP program to connect to MySQL database which retrieves the data from the tables and display them to the user.

10. Write a PHP program to insert the details entered by the user in the Registration form into MySQL database.

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
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DEPARTMENT OF IT

Semester/Year	VI/III	Program	B.Tech – IT
Subject Category: DE-2	Subject Code: IT 603 (A)	Subject Name	Cloud Computing

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	0	4

Prerequisites:

Basic Knowledge of computer network and data structures.

Course Objective:

1) Discuss the concepts, characteristics, delivery models and benefits of cloud computing.
2) Explore the key technical, organisational and compliance challenges of cloud computing.
3) Grasp the concepts of virtualization efficiently.
4) Explore the security issues that arise from cloud computing architectures intended for delivering Cloud based enterprise IT services.

UNITs	Descriptions	Hrs.
I	Introduction, Cloud Infrastructure: Cloud computing, Cloud computing delivery models and services, Ethical issues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Opensource software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. Exercises and problems	8
II	Cloud Computing: Application Paradigms.: Challenges of cloud computing, Architectural styles of cloud computing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: The Zookeeper, The Map Reduce programming model, A case study: The Gre The Web application, Cloud for science and engineering, Highperformance computing on a cloud, Cloud computing for Biology research, Social computing, digital content and cloud computing.	8
III	Cloud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual Machines, Performance and Security Isolation, Full virtualization and paravirtualization, Hardware support for virtualization, Case Study: Xen a VMM based paravirtualization, Optimization of network virtualization, vBlades, Performance comparison of virtual machines, The dark side of virtualization, Exercises and problems.	8
IV	Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Application of control theory to task scheduling on a cloud, Stability of a twolevel resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers, A utility-based model for cloud-based Web services, Resourcing bundling: Combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling MapReduce applications subject to deadlines, Resource management and dynamic scaling, Exercises and problems	8
V	Cloud Security, Cloud Application Development: Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security	8

	risks posed by a management OS, A trusted virtual machine monitor, Amazon web services: EC2 instances, Connecting clients to cloud instances through firewalls, Security rules for application and transport layer protocols in EC2, How to launch an EC2 Linux instance and connect to it, How to use S3 in java, Cloud-based simulation of a distributed trust algorithm, A trust management service, A cloud service for adaptive data streaming, Cloud based optimal FPGA synthesis .Exercises and problems.	
Total Hours		40

Course Outcomes:

CO-1: Compare the strengths and limitations of cloud computing.
CO2: Identify the architecture, infrastructure and delivery models of cloud computing.
CO-3: Demonstrate the working of VM and VMM on any cloud platforms(public/private), and run a software service on that.
CO-4: Identify the known threats, risks, vulnerabilities and privacy issues associated with Cloud based IT services.

Text Book & Reference Books-

1. Cloud Computing: Theory and Practice, Dan C Marinescu Elsevier (MK), 2013.
2. Computing Principles and Paradigms, Rajkumar Buyya , James Broberg, Andrzej Goscinsk,i Willey, 2014.
3. Cloud Computing Implementation, Management and Security John W Rittinghouse, James F Ransome, CRC Press, 2013.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT					
Subject Category	DE-2	Subject Code:		IT 603 (B)	Subject Category	Sensor Network					
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	0	4

Prerequisites:

- Basic knowledge of Data Communication Networks.

Course Objective:

- To make students understand the basics of Wireless sensor Networks.
- To familiarize with learning of the Architecture of WSN.
- To understand the concepts of Networking and Networking in WSN.
- To study the design consideration of topology control and solution to the various problems.
- To introduce the hardware and software platforms and tool in WSN.

UNITs	Descriptions	Hrs.
I	OVERVIEW OF WIRELESS SENSOR NETWORKS- SingleNode Architecture Hardware Components Network Characteristics unique constraints and challenges, Enabling Technologies for Wireless Sensor Networks Types of wireless sensor networks	9
II	ARCHITECTURES- Network Architecture Sensor Networks Scenarios Design Principle, Physical Layer and Transceiver Design Considerations, Optimization Goals and Figures of Merit, Gateway Concepts, Operating Systems and ExecutionEnvironments introduction to Tiny OS and nesC Internet to WSN Communication.	9
III	NETWORKING SENSORS MAC- Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts – SMAC, BMAC Protocol, IEEE 802.15.4 standard and ZigBee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols EnergyEfficient Routing, Geographic Routing.	8
IV	INFRASTRUCTURE ESTABLISHMENT-Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.	8
V	SENSOR NETWORK PLATFORMS AND TOOLS- Sensor Node Hardware – Berkeley Motes, Programming Challenges, Nodelevel software platforms, Node level Simulators, Statecentric programming.	8
Total Hours		40

Course Outcomes:

CO 1: Understand challenges and technologies for wireless networks.
CO 2: Understand architecture and sensors.
CO 3: Describe the communication, energy efficiency, computing, storage and transmission
CO 4: Establishing infrastructure and simulations.
CO 2: Explain the concept of programming the in WSN environment.

Text Book & Reference Books-

1. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

2. Feng Zhao & Leonidas J.Guibas, “Wireless Sensor Networks An Information Processing Approach", Elsevier, 2007.
3. Waltenegus Dargie , Christian Poellabauer, “Fundamentals of Wireless Sensor Networks Theory and Practice”, John Wiley & Sons Publications, 2011
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor NetworksTechnology, Protocols, and Applications”, John Wiley, 2007.
5. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	2	3	3									2	3
CO-2	2	1	1	2									1	2
CO-3														
CO-4														
CO-5														

Suggestive list of experiments:

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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Semester/Year		V/III		Program		B.Tech – IT				
Subject Category	OC	Subject Code:	IT 603 (C)		Subject Name	Soft Computing				
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	0	4

Prerequisites:

- Basic Knowledge of programming and data structures.

Course Objective:

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for real-world problems.
2. To provide adequate knowledge of non-traditional technologies and fundamentals of artificial neural networks, back propagation networks, fuzzy sets, fuzzy logic, geneticalgorithms in solving social and engineering problems.
3. To provide comprehensive knowledge of associative memory networks and adaptive resonance theory.

UNITs	Descriptions	Hrs.
I	Introduction to Soft Computing: Soft computing vs. hard computing, evolution of soft computing, features and types of soft computing, applications of soft computing, basics of machine learning.	8
II	Neural Networks and Back Propagation networks: Basic concepts of Neural Networks, Model of Artificial Neuron, Neural Network Architectures, Characteristics of neural networks, Learning Methods, Early neural network architectures, Application domains. Back propagation network (BPN), Back propagation Learning, Applications of BPN, Parameter selection, Variations of Back propagation Algorithms.	8
III	Associative Memory Networks: Auto correlators, hetero correlators: Kosko's discrete Bi-direction associative memory (BAM), Exponential BAM, Application of Character Recognition. Unsupervised learning: Adaptive Resonance: Adaptive Resonance Theory (ART), Classical ART Networks, Simplifies ART Architecture, Features, algorithms and Illustration of ART1 and ART2 model, Related Applications.	8
IV	Fuzzy Sets and Fuzzy Relations**:** Fuzzy versus Crisp, Crisp Sets, Fuzzy sets, Membership functions, fuzzy set operations, properties of Fuzzy sets, Crisp Relations, Fuzzy relations – Fuzzy Cartesian product, Operations of Fuzzy Relations. Fuzzy Logic and Inference: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Quantifiers, Fuzzy Inference, Fuzzy knowledge and rule-based system, fuzzy decision making, Defuzzification, Application of fuzzy logic.	8
V	Genetic Algorithms**:** History of Genetic Algorithm, Basic concepts, Creation of offspring, working principles, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, crossover, inversion & deletion, mutation operator,	8

	Bitwise operator, Generational Cycle, Convergence of GA,Applications & advances in GA, Differences & similarities between GA & other traditional method, Hybrid systems, evolutionary computing, Genetic Algorithm based on Backpropagation networks- Implementation and comparison on performance of traditional algorithms with Genetic Algorithm.	
Total Hours		40

Course Outcomes:

CO-1: Apply neural networks, bidirectional associative memories and adaptive resonance theory for solving different engineering problems.
CO-2: Identify and describe soft computing techniques and build supervised learning and unsupervised learning networks.
CO-3: Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
CO-4: Apply genetic algorithms to combinatorial optimization problems.
CO-5: Evaluate and compare solutions by various soft computing approaches for a given problem.

Text Book & Reference Books-

1. S, Rajasekaran& G.A. VijayalakshmiPai, "Neural Networks, Fuzzy systems and evolutionary algorithms: Synthesis and Applications", PHI Publication, 2 ndEd. 2017.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", John Wiley and Sons, 3 rded, 2011.
3. S.N. Sivanandam& S.N. Deepa, "Principles of Soft Computing", Wiley Publications, 3rded, 2018.
4. Jang, Jyh-Shing Roger, Chuen-Tsai Sun, and EijiMizutani. "Neuro-fuzzy and soft computinga computational approach to learning and machine intelligence" Pearson, 1997.

List/Links of e-learning resource

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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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	3		2										
CO-2	2	2												
CO-3	2	1	3											
CO-4	1	2												
CO-5	3	3		2										

Suggestive list of experiments:

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Subject handled by department	Department of IT

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DEPARTMENT OF IT

Semester/Year		V/III		Program		B.Tech – IT				
Subject Category	DE	Subject Code:	IT 604 (A)	Subject Name	Information Security					
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	0	4

Prerequisites:

Basic knowledge of programming and data structures.

Course Objective:

1. Explain the objectives of information security.
2. Explain the importance and application of each of confidentiality, integrity, authentication and availability
3. Understand various cryptographic algorithms.
4. Understand the basic categories of threats to computers and networks.
5. Describe public-key cryptosystem.
6. Describe the enhancements made to IPv4 by IPSec
7. Understand Intrusions and intrusion detection.
8. Discuss the fundamental ideas of public-key cryptography.
9. Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail and message.
10. Discuss Web security and Firewalls.

UNITs	Descriptions	Hrs.
I	Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.	8
II	Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.	8
III	Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm Authentication Applications: Kerberos, X.509 Authentication Service, Public — Key Infrastructure, Biometric Authentication.	8
IV	E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP	8

	Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.	
V	Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections.	8
Total Hours		40

Course Outcomes:

CO-1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
CO-2: Understand Symmetric key Ciphers and Asymmetric key Ciphers.
CO-3: Analyze Message Authentication Algorithms and Hash Functions.
CO-4: Ability to identify information system requirements for both of them such as client and server.
CO-5: Ability to understand the current legal issuestowards information security.

Text Book & Reference Books-

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lst Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGELearning
6. Network Security and Cryptography: Bernard Menezes, CENGAGELearning

List/Links of e-learning resource

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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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1														
CO-2														
CO-3														
CO-4														
CO-5														

Suggestive list of experiments:

Recommendation by Board of studies on	
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Semester/Year	VI/III	Program	B.Tech – IT
Subject Category: DE-3	Subject Code: IT 604 (B)	Subject Name	Data Science Analytics

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	0	4

Prerequisites:

Data Science ,Machine Learning

Course Objective:

Course Outcomes :After completion of this course students will be able to

UNITs	Descriptions	Hrs.
I	Statistical Analysis System(SAS): Collection of Data, Sample Measurement and Scaling Techniques, Statistical Derivatives and Measures of Central Tendency, Measures of Variation and Skewness, Correlation and Simple Regression, Time Series Analysis, Index Numbers, Probability and Probability Rules Probability Distributions, Tests of Hypothesis–I, Tests of Hypothesis – II, Chi-Square Test	8
II	Apache Spark: Introduction, Features, Spark built on Hadoop, Components of Spark: Apache Spark Core, Spark SQL, Spark Streaming, MLlib (MachineLearning Library), GraphX BigML: WebInterface, Command Line Interface, API, Creating a deep learning model with BigML	8
III	Data-Driven Documents (D3.js): Introduction, Web Standards: Hyper Text Markup Language(HTML), Document Object Model (DOM),Cascading Style Sheets (CSS), ScalableVectorGraphics (SVG), JavaScript. MatLab: Matlab Environment Setup, Syntax, Variables, Commands, M-files, Data types and Operators.	8
IV	NaturalLanguageToolkit(NLTK):TokenizingText, Training Tokenizer & Filtering Stopwords, Looking up words in Wordnet Stemming & Lemmatization, Natural Language Toolkit - Word Replacement, Synonym & Antonym Replacement. Tensor Flow: Convolutional Neural Networks, Tensor Board Visualization, Tensor Flow-Word Embedding, Tensor Flow-Linear Regression	8
V	Tableau: DesignFlow, File Types, Data Types, Data Terminology, Datasource,worksheetandcalculations. Scikit-learn: Introduction, Modelling Process, Data Representation, Estimator API, Conventions, LinearModeling.	8
Total Hours		40

Course Outcomes:

CO-1: Student will be able various forms of learning and data representation.
CO-2: .Understand the concepts of CNN, Back propagation and deconvolution method.
CO-3: Understand various CNN's apply these detection and segmentation problems.

CO-4: Understand various Attention models in Vision.
CO-5: Understand various generative models, Self supervised and reinforcement Learning in vision.

Text Book & Reference Books-

List/Links of e-learning resource

- https://archive.nptel.ac.in

Modes of Evaluation and Rubric

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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														
CO-2														
CO-3														
CO-4														
CO-5														

Suggestive list of experiments:

Recommendation by Board of studies on	
Approval by Academic council on	
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DEPARTMENT OF IT

Semester/Year	VI/III	Program	B.Tech – IT
Subject Category: DE-3	Subject Code: IT 604 (C)	Subject Name	Robotics Process Automation

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	0	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics.

Course Objective:

1 Understand the RPA and the ability to differentiate it from other types of automation.
2. Model the sequences and the nesting of activities.
3. Experiment with workflow in a manner to get the optimized output from a Bot.

UNITs	Descriptions	Hrs.
I	Automation RPA vs Automation - Processes & Flowcharts - Programming Constructs Types of Bots Workloads automated RPA Advanced Concepts - Standardization of processes - RPA Development methodologies SDLC - Robotic control flow architecture - RPA business case - RPA Team - Process Design Document/Solution Design Document Risks & Challenges with RPA - RPA and emerging ecosystem.	8
II	User Interface - Variables - Managing Variables - Naming Best Practices - Variables Panel The Arguments Panel - Importing New Namespaces- Control Flow - Control Flow Introduction - Control Flow Activities - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data.	8
III	Basic and Desktop Recording , Web Recording , Input/Output Methods Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors - RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation - Image based automation - Keyboard based automation - Information Retrieval.	8
IV	Monitoring system event triggers - Hotkey trigger - Mouse trigger - System trigger - Monitoring image and element triggers - An example of monitoring email - Example of monitoring a copying event and blocking it - Launching an assistant bot on a keyboard event, EXCEPTION HANDLING: Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors.	8
V	DEPLOYING AND MAINTAINING THE BOT: Publishing using publish utility - Creation of Server - Using Server to control the bots - Creating a provision Robot from the Server - Connecting a Robot to Server - Deploy the Robot to Server - Publishing and managing updates - Managing packages - Uploading packages - Deleting packages.	8
Total Hours		40

Course Outcomes:

CO 1: Describe RPA, where it can be applied and how it's implemented.
CO 2: Shows the different types of variables, Control Flow and data manipulation techniques.
CO 3: Identify and understand Image, Text and Data Tables Automation.
CO 4: Describe how to handle the User Events and various types of Exceptions and strategies.
CO 5: Understand the Deployment of the Robot and to maintain the connection.

Text Book & Reference Books-

1. Alok Mani Tripathi, "Learning Robotic Process Automation", Packt Publishing, 2018.
2. Frank Casale , Rebecca Dilla, Heidi Jaynes , Lauren Livingston, "Introduction to Robotic Process Automation: a Primer", Institute of Robotic Process Automation,1st Edition 2015.
3. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant", Independently Published, 1st Edition 2018.
4. Srikanth Merianda,"Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation", Consulting Opportunity Holdings LLC, 1st Edition 2018.
5. Lim Mei Ying, "Robotic Process Automation with Blue Prism Quick Start Guide: Create software robots and automate business processes", Packt Publishing, 1st Edition 2018.

List/Links of e-learning resource

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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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

Recommendation by Board of studies on	
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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT
Subject Category	OC-4	Subject Code:	IT 605(A)	Subject Category		Web Application Development

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

Prerequisites:

Course Objective:

4. To introduce concepts of designing web pages using HTML, CSS and Javascript.
5. To familiarize with JSP programming and XML.
6. To impart PHP programming and master database access using PHP and MySQL.

UNITs	Descriptions	Hrs.
I	**Introduction:** Concept of WWW, Internet and WWW **HTTP Protocol:** Request and Response, Web browser and Web servers, **Features of Web 2.0 Web Design:** Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Web site, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.	8
II	**HTML:** Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5	8
III	**Style sheets :** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2 **Overview and features of CSS3 JavaScript :** Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, **Advance JavaScript :** Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations **DHTML :** Combining HTML, CSS and Javascript, Events and buttons	8
IV	**XML :** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. **Transforming XML using XSL and XSLT PHP:** Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files **Advance Features :** Cookies and Sessions, Object Oriented Programming with PHP	8
V	**PHP and MySQL :** Basic commands with PHP examples,	8

	Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs	
Total Hours		40

Course Outcomes:

the students will be able to

- Understand the concept of WWW, Internet and Planning, designing and publishing of website.
- Understand and applying concepts of HTML.
- Design dynamic web pages using HTML, CSS and JavaScript.
- Understanding and Applying concept of XML.
- Connect to MySQL using PHP and perform various operations

Text Book & Reference Books-

Text Book

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

Reference Books-

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dremtech
2. Java Server Pages – Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W. Sebesta. Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

List/Links of e-learning resource

https://nptel.ac.in/courses/106106156

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2	3	1										
CO-2	3		3		3									
CO-3	3	2	3		3									
CO-4	3	2	3		3									
CO-5	3	2	3		3									

Suggestive list of experiments:

1. Design the following static web pages required for an online book store web site.
2. Home Page ii. Login Page iii. Catalogue Page
3. Design the following static web pages required for an online book store web site.
4. Registration Page ii. Cart Page
5. Design a web page using CSS which includes the following:
6. Use different font and text styles
7. Set a background image for both the page and single element on the page.
8. Define styles for links
9. Working with layers
10. Adding a Customized cursor
11. i. Write a JavaScript to validate the fields of the login page.
12. Write a JavaScript to validate the fields of the Registration page
13. Write an XML file which will display the Book information which includes the following: Title of the book, Author Name, ISBN number, Publisher name, Edition and Price. Validate the above document using DTD and XML Schema.
14. i. Write a PHP program to validate the fields of the login page.
15. Write a PHP program to validate the fields of the Registration page

16. Write a JSP to connect to the database and extract data from the tables and display them to the user.
17. Design a JSP to insert the details of the users who register through the registration page and store the details in to the database.
18. Write a PHP program to connect to MySQL database which retrieves the data from the tables and display them to the user.
19. Write a PHP program to insert the details entered by the user in the Registration form into MySQL database.

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DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech –IT				
Subject Category	OC	Subject Code:	IT 605 (B)	Subject Name	Big Data Analytics					

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:

- Knowledge of one Programming Language
- Practice of SQL (queries and sub queries)
- Exposure to Linux Environment.

Course Objective:

• Understand the Big Data Platform and its Use cases
• Provide an overview of Apache Hadoop
• Provide HDFS Concepts and Interfacing with HDFS
• Understand Map Reduce Jobs
• Provide hands on Hodoop Eco System
• Apply analytics on Structured, Unstructured Data.
• Exposure to Data Analytics with R.

UNITs	Descriptions	Hrs.
I	**INTRODUCTION TO BIG DATA AND HADOOP** Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.	8
II	**HDFS(Hadoop Distributed File System)** The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.	8
III	**Map Reduce** Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.	8
IV	**Hadoop Eco System** **Pig :** Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. **Hive :** Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. **Hbase :** HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. **Big SQL** : Introduction	10
V	**Data Analytics with R** Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with Big R.	8
Total Hours		42

Course Outcomes:

The students will be able to:

- Identify Big Data, list the components of Hadoop and Hadoop Eco-System.
- Understand Hadoop Distributed File System.
- Understand and manage Map reduce,Job Execution, task execution.
- Understand and Develop Big Data Solutions using Hadoop Eco System.
- Understand and apply Machine Learning Techniques using R.

Text Book & Reference Books-

Text Book

• Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
• Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Reference Books-

• Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
• Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
• Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
• Anand Rajaraman and Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
• Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
• Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
• Pete Warden, "Big Data Glossary", O'Reily, 2011.
• Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
• ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
• Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

List/Links of e-learning resource

- https://www.shiksha.com/online-courses/big-data-hadoop-courses-certification-training-by-nptel-st367

Modes of Evaluation and Rubric

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

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													
CO-2	3	2												
CO-3	3	2	3	3										
CO-4	3	2	3	3										
CO-5	3	2	3	3										

Suggestive list of experiments:

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)
DEPARTMENT OF IT

Semester/Year		VI/III		Program		B.Tech – IT					
Subject Category	OC-4	Subject Code:		IT 605 (C)	Subject Name	Deep Learning					
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:

Basic knowledge of Machine learning and Programming language.

Course Objective:

1. Explain the Machine learning with deep learning techniques.
2. Understand the concept of CNN and transfer learning techniques, to apply it in the classification problems.
3. Use RNN for language modelling and time series prediction..
4. Use auto encoder and deep generative models to solve problems with high dimensional data including text, image and speech.

UNITs	Descriptions	Hrs.
I	Introduction and Overview: Course Overview and Motivation; Introduction to Image Formation, Capture and Representation; Linear Filtering, Correlation, Convolution. Visual Features and Representations: Edge, Blobs, Corner Detection; Scale Space and Scale Selection; SIFT, SURF; HoG, LBP, etc. Visual Matching: Bag-of-words, VLAD; RANSAC, Hough transform; Pyramid Matching; Optical Flow.	8
II	Deep Learning Review: Review of Deep Learning, Multi-layer Perceptrons, Backpropagation Convolutional Neural Networks (CNNs): Introduction to CNNs; Evolution of CNN Architectures: AlexNet, ZFNet, VGG, InceptionNets, ResNets, DenseNets. Visualization and Understanding CNNs: Visualization of Kernels; Backprop-to-image/Deconvolution Methods; Deep Dream, Hallucination, Neural Style Transfer; CAM,Grad-CAM, Grad-CAM++; Recent Methods (IG, Segment-IG, SmoothGrad).	8
III	CNNs for Recognition, Verification, Detection, Segmentation: CNNs for Recognition and Verification (Siamese Networks, Triplet Loss, Contrastive Loss, Ranking Loss); CNNs for Detection: Background of Object Detection, R-CNN, Fast R-CNN, Faster R-CNN, YOLO, SSD, RetinaNet; CNNs for Segmentation: FCN, SegNet, U-Net, Mask-RCNN.	8
IV	Recurrent Neural Networks(RNNs): Review of RNNs; CNN + RNN Models for Video Understanding: Spatio-temporal Models, Action/Activity Recognition Attention Models: Introduction to Attention Models in Vision; Vision and Language: Image Captioning, Visual QA, Visual Dialog; Spatial Transformers; Transformer Networks.	8

V	Deep Generative Models: Review of (Popular) Deep Generative Models: GANs, VAEs; Other Generative Models: PixelRNNs, NADE, Normalizing Flows, etc Recent Trends: Zero-shot, One-shot, Few-shot Learning; Self-supervised Learning; Reinforcement Learning in Vision; Other Recent Topics and Applications.	8
Total Hours		40

Course Outcomes:

CO-1: Student will be able various forms of learning and data representation.
CO-2: .Understand the concepts of CNN, Back propagation and deconvolution method.
CO-3: Understand various CNN's apply these detection and segmentation problems.
CO-4: Understand various Attention models in Vision.
CO-5: Understand various generative models, Self supervised and reinforcement Learning in vision.

Text Book & Reference Books-

1. Ian Goodfellow, Yoshua Bengio and Aaron Courville, " Deep Learning", MIT Press, 2017..
2.Umberto Michelucci "Applied Deep Learning. A Case-based Approach to Understanding Deep Neural Networks" Apress, 2018.
3. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012.
4. Ethem Alpaydin,"Introduction to Machine Learning", MIT Press, Prentice Hall of India, Third Edition 2014.
5. Giancarlo Zaccone, Md. Rezaul Karim, Ahmed Menshawy "Deep Learning with TensorFlow: Explore neural networks with Python", Packt Publisher, 2017.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1														
CO-2														
CO-3														
CO-4														
CO-5														

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		V/III	Program		B.Tech – Information Technology
Subject Category	DLC	Subject Code:	IT- 606	Subject Name	Android Programming

Maximum Marks Allotted							Contact Hours			Total Credits
Theory			Practical			Total Marks				
ES	MS	Assignment/Quiz	ES	L W	Quiz		L	T	P	
-	-	-	30	10	10-	50	0	0	2	1

Prerequisites:

Building an Android app comes down to two major skills/languages: Java and Android.

Course Objective:

- Explain different techniques for developing applications for mobile devices.
- Understand the Android OS architecture.
- Understand the operation of the application, application lifecycle, configuration files, intents, and activities, services & Receivers.
- Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.

UNITs	Descriptions	Hrs.
I	Introduction to Android, A little Background about mobile technologies , Overview of Android - An Open Platform for Mobile development, Open Handset Alliance Developing for Android: First Android Application, setup Android Development Environment. Android development Framework - Android-SDK, Eclipse Emulators, Creating & setting up custom Android emulator Android Project Framework.	**6**
II	Android Activities and UI Design, Understanding Intent, Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Expressions and Flow control, Android Manifest Simple UI - Layouts and Layout properties, Fundamental Android UI Design, introducing Layouts, Creating new Layouts, Drawable Resources, Resolution and density independence (px ,dip, dp, sip, sp) XML Introduction to GUI objects viz. Push Button, Text / Labels, Edit Text, Toggle Button, Weight Sum Padding, Layout Weight.	10
III	Advanced UI Programming , Event driven Programming in Android(Text Edit, Button clicked etc.),Creating splash screen, Event driven Programming in Android, Android Activity Lifecycle, Creating threads for gaming requirement, Understanding the Exception handler, Toast, Menu, Dialog, List and Adapters, Custom Vs. System Menus Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Manifest.xml File Update.	12
IV	Multimedia Programming using Android, Multimedia audio formats - Creating and Playing, Multimedia audio formats - Kill / Releasing (Memory Management),e audio in any application video playback with an event, Database - SQLite, SQLite Open Helper and creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes, Location Based Services and Google Maps, Using Location Based Services, Working with Google Maps	8

V	Notifications Notification Manager, Pending Intent Notifications (Show and Cancel), custom made Web browser, Web View object in XML, Methods for associated with 'Go', 'Back', 'Forward' etc. Android Development using other Tools, Other ways to Develop Android Applications, Graphics / Game development using, Installation of .apk, install .apk into your Android Mobile.	7
Total Hours		40

Course Outcomes:

CO-1: Explain the purpose of different development tools for Android
CO-2: Utilize Android Studio to Design simple and complex graphical user interface
CO-3: Develop the algorithm to manage simple and complex Event handle
CO-4: Develop and design the database design for storage based application
CO-5: Plan, prepare, build and Publish an application to the Android Market

Text Book

1. Android Developer Tools Essentials by Mike Wolfson - O'Reilly Media Publication

Reference Books

1. Learn Java for Android Development,2nd Edition- Jeff Friesen- Apress Publications
2. OpenGL ES 2 for Android - Kevin Brothaler - The Pragmatic Programmers.

List/Links of e-learning resource

- https://nptel.ac.in/courses/106106147

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	1	2										1	2
CO-2	1	1	1										1	2
CO-3	1	1	1		1								1	2
CO-4	2	1	1				1							2
CO-5	2	1											1	

Suggestive list of experiments:

1. Introduction to Android Operating System
2. Program for First Android Application.
3. Program for building a simple user interface using a XML for UI layout.
4. Program for developing an Android Application using a linear layout.
5. Program for developing an Android Application using a Relative layout.
6. Program for developing an Android Application using a Table layout.
7. Program for developing an Android Application using a Absolute layout.
8. Program for developing an Android Application using a Frame layout.
9. Developing an android application using Relative layout to display Date and time.
10. Study of android lifecycle and demonstration of it.
11. Study of intents and types of intents
12. Study of list views and adapters
13. Study of dialog interfaces in android
14. Study of Sensors in android
15. Study of Services in android
16. Study of touch in android

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
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DEPARTMENT OF IT

Semester/Year	VI/III	Program	B.Tech – IT
Subject Category	Subject Code	IT-607	Subject Name: Minor Project

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
-	-	-	-	50	50	-	100	-	-	4	2

Prerequisites:

Knowledge of Computer Programming Language and MATLAB

Course Objective:

Minor project may be carried out in one or more form of following: product preparations, working/non-working models, prototype development, fabrication of set-ups, laboratory experimentdevelopment, process modification/development, simulation, software development, integration of software and hardware, statistical data analysis, survey, creating awareness in society.

The student is required to submit a report based on the work. The evaluation of the project shall be on continuous basis. Guidelines: A project to be developed based on database management at the back end and any other application development at the front end.

UNITs	Descriptions	Hrs.
I	Digital Image Fundamentals: A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.	8
II	Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8
III	Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8
IV	Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8
V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
Total Hours		40

Course Outcomes:

After successful completion of the course, students will be able to practiceacquired knowledge within the chosen area of technology for project development

CO-1: Identify, discuss and justify the technical aspects of the chosen project with a comprehensive.

CO-2: Systematic approach reproduce, improve and refine technical aspects for engineeringprojects.

CO-3: Work as an individual or in a team in development of technical projects

CO-4: Communicate and report effectively project related activities and findings.

Text Book & Reference Books-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Sonka, Digital Image Processing & Computer Vision, Cengage Learning.
3. Jayaraman, Digital Image Processing, TMH.

4. Pratt, Digital Image Processing, Wiley India.
5. Annadurai, Fundamentals of Digital Image Processing, Pearson Education.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV	Program		B.Tech – IT
Subject Category	DC	Subject Code:	IT 701	Subject Name	Software Testing and Quality

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 programming skills and data structures.

Course Objective:

1. To introduce Software testing principles.
2. To introduce knowledge of testing techniques and levels of testing
3. To understand Automation and Quality Metrics.
4. To Quality Assurance tools and Models.
5. To introduce Quality Assurance trends.

UNITs	Descriptions	Hrs.
I	Testing as an engineering activity, Role of process in software quality, Testing as a process, Basic definitions, Software testing principles, The tester's role in a software development organization, Origins of defects, Defect classes, The defect repository and test design, Defect examples, Developer / Tester support for developing a defect repository.	8
II	Testing techniques and levels of testing: Using White Box Approach to Test design - Static Testing Vs. Structural Testing, Code Functional Testing, Coverage and Control Flow Graphs, Using Black Box Approaches to Test Case Design, Random Testing, Requirements based testing, Decision tables, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing, Levels of Testing -Unit Testing, Integration Testing, Defect Bash Elimination. System Testing - Usability and Accessibility Testing, Configuration Testing, Compatibility Testing.	8
III	Automation and Quality Metrics Software Test Automation, Skills needed for Automation, Scope of Automation, Design and Architecture for Automation, Requirements for a Test Tool, Challenges in Automation Tracking the Bug, Debugging. Testing Software System Security - Six-Sigma, TQM - Complexity Metrics and Models, Quality Management Metrics, Availability Metrics, Defect Removal Effectiveness, FMEA, Quality Function Deployment, Taguchi Quality Loss Function, Cost of Quality.	8
IV	Quality Assurance tools and Models SQA basics, Components of the Software Quality Assurance System, software quality in business context, planning for software quality assurance, product quality and process quality, software process models, 7 QC Tools and Modern Tools. Models for Quality Assurance, ISO-9000 series, CMM, CMMI, Test Maturity Models, SPICE, Malcolm Baldrige Model- PCMM.	8
V	Quality Assurance trends; Software Process- PSP and TSP, OO Methodology, Clean-room software engineering, Defect Injection and prevention, Internal Auditing and Assessments, Inspections &	8

	Walkthroughs, Case Tools and their Affect on Software Quality.	
Total Hours		40

Course Outcomes:

CO1. Test the software by applying testing techniques to deliver a product free from bugs.
CO2. Investigate the scenario and to select the proper testing technique.
CO3. Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics.
CO4. Understand how to detect, classify, prevent and remove defects.
CO5. Choose appropriate quality assurance models and develop quality.

Text Book & Reference Books-

1. Srinivasan Desikan, Gopalaswamy Ramesh,Software Testing: Principles and Practices Pearson.
2. Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson Addison Wesley.
3. Aditya P. Mathur, Foundations of Software Testing, Pearson.
4. Paul Ammann, Jeff Offutt, Introduction to Software Testing, Cambridge University Press.
5. Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Auerbach Publications.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

1. To determine the nature of roots of a quadratic equations, its input is triple of +ve integers (say x,y,z) and values may be from interval[1,100] the program output may have one of the following:- [Not a Quadratic equations, Real roots, Imaginary roots, Equal roots] Perform BVA.
2. To determine the type of triangle. Its input is triple of +ve integers (say x,y,z) and the values may be from interval[1,100].The program output may be one of the following [Scalene, Isosceles, Equilateral, Not a Triangle].Perform BVA
3. Perform robust case testing on Problem No. 1.
4. Perform robust case testing on Problem No. 2.
5. Create a test plan document for any application (e.g. Library Management System)
6. Experiment: Study of Any Testing Tool (Win Runner)
7. Experiment: Study of Any Test Management Tool (QA Complete)
8. Experiment: Automate the Test cases using Test Automation tool(using QA Complete)
9. Experiment: Learn how to raise and report Bugs using Bug tracking tool (Bugzilla,Jira using QA Complete)
10. Experiment: Study of any open source testing tool (Web Performance Analyzer/O STA).

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program		B.Tech – IT				
Subject Category	DE-4	Subject Code:		IT 702 (A)	Subject Category	Distributed System				
Maximum Marks Allotted								Contact Hours			Total Credits Theory Quiz
Theory				Practical			Total Marks Quiz				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	1	0	4

Prerequisites:

1. Basic knowledge of "Operating Systems"and "Computer Organization & Architecture"

Course Objective:

1. This course provides an insight into Distributed systems.
2. Topics include- Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory.

UNITs	Descriptions	Hrs.
I	Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.	8
II	Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture.	8
III	Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.	8
IV	Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.	8
V	Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data. Distributed shared memory, Design and Implementation issues, Consistency models.	8
Total Hours		40

Course Outcomes:

CO1: Ability to understand Transactions and Concurrency control.
CO2: Ability to understand Security issues.
CO3: Understanding Distributed shared memory.
CO4: Ability to design distributed systems for basic level applications.

Text Book & Reference Books-

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.
3. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
4. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_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										

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program		B.Tech – IT				
Subject Category	DE-4	Subject Code:	IT 702 (B)	Subject Name	Internet Technology					

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 Computer Networks and Computer Programming.

Course Objective:

A) To develop an understanding of the technological foundations of the Internet and core Internet protocols (TCP/IP, SMTP, FTP, Telnet, ICMP, RSS, and HTTP);

B) To understand client/server relationships in the context of the Internet and intranets;

C) To identify important Internet content and graphics formats and understand the access issues they present users and the software they require;

D) To develop a framework for evaluating web resources and designs;

UNITs	Descriptions	Hrs.
I	History and scope of The Internet, Principles of internetworking, Connecting devices- Repeaters, Bridges, Routers, Gateways. IP Addressing- Classful IP addressing and Classless IP Addressing, Concept of sub netting & super netting . Special addresses .	8
II	**Network Layer Protocols**- Forwarding Techniques for an IP Packet, Packet format of IP Protocol, ARP, RARP, Proxy ARP, Brief explanation of Internet Control Message Protocol (ICMP) and Internet Group Management Protocol (IGMP).	8
III	**Transport Layer Protocols-** Concept of Process-To-Process Communication, Brief explanation of User Datagram Protocol (UDP) & Transmission Control Protocol(TCP) , Connection Establishment & Connection Termination in TCP, Sliding Window Protocol, Congestion control in TCP,TCP Timers, SCTP.	8
IV	**Routing Protocols-** INTRA and INTER Domain Routing, Distance Vector Routing, Link State Routing, Path Vector Routing, RIP, OSPF, BGP, Multicasting- Multicast Link State Routing, Multicast Distance Vector Routing.	8
V	**Upper Layer Protocols-** Domain Name System (DNS), BOOTP ,DHCP , TELNET, FTP, TFTP, SMTP ,SNMPMobile IP, Fault management, Fault management functions	8
Total Hours		40

Course Outcomes:

The students would be able to-

CO-1: Develop a fundamental understanding of principles of Internetworking and characteristics ofconnecting Devices and IP addressing.

CO-2: Describe the Network layer protocol such as IP, ARP, RARP, ICMP and IGMP.

CO-3: Explain the role of transport layer, and analyze the role and services of transport layer protocol suchas TCP and UDP.

CO-4: Distinguish between various routing techniques such as distance vector and link state routingtechniques.

CO-5: Examine working of upper layer protocol.

Text Book & Reference Books-

1. TCP/IP Protocol Suite by Behrouz A.Forouzan..
2. Internetworking with TCP/IP By Douglas E. Comer.
3. Computer Networks by Andrew S. Tanenbaum

List/Links of e-learning resource

- https://archive.nptel.ac.in

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_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2	2										3	
CO-2	3	3	2		1		1			2		2	2	2
CO-3	3	2	1		2		2			2		3	2	2
CO-4	3	3	2	2	2	2	2			2		2	2	3
CO-5	3	3							1	1		1	2	

Suggestive list of experiments:

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)
DEPARTMENT OF IT

Semester/Year		VII/IV		Program		B.Tech – IT					
Subject Category	DE-4	Subject Code:		IT 702 (C)	Subject Name	Computer Vision					
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	0	4

Prerequisites:

Basic Knowledge of algorithms, Discrete Mathematics

Course Objective:

1 Understand the computer imaging systems.
2. Understand the Pattern Analysis.
3. Understand the Classifiers.

UNITs	Descriptions	Hrs.
I	Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.	8
II	Edge detection, Edge detection performance, Hough transform, corner detection Segmentation, Morphological filtering, Fourier transform.	8
III	Feature extraction, shape, histogram, color, spectral, texture, using CV IP tools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing.	8
IV	Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians Classification: Discriminant Function, Supervised, Unsupervised, Semi-supervised.	8
V	Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods. Recent trends in Activity Recognition, computational photography, Biometrics.	8
Total Hours		40

Course Outcomes:

CO1: Identify basic concepts, terminology, theories, models and methods of computer vision.
CO2: Describe basic methods of computer vision related to multi-scale representation.
CO3: Understanding edge detection of primitives, stereo, motion and object recognition.
CO4: Developed the practical skills necessary to build computer vision applications.
CO5:To have gained exposure to object and scene recognition..

Text Book & Reference Books-

1. "Human Computer Interaction" by Alan Dix, Janet Finlay , ISBN :9788131717035, Pearson Education (2004).
2. "Designing the User Interface - Strategies for Effective Human Computer Interaction", by Ben Shneiderman ISBN: 9788131732557, Pearson Education (2010).
3. Usability Engineering: Scenario-Based Development of Human-Computer Interaction ,

by Rosson, M. and Carroll, J. (2002).
4. The Essentials of Interaction Design, by Cooper, et al. , Wiley Publishing(2007).
5. The Resonant Interface: HCI Foundations for Interaction Design , by Heim, S. , AddisonWesley. (2007)

List/Links of e-learning resource

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Modes of Evaluation and Rubric

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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	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program		B.Tech -IT					
Subject Category	DE-5	Subject Code:		IT 703 (A)	Subject Name	Information and Storage Retrieval					
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	0	4

Prerequisites:

Basic knowledge of DBMS

Course Objective:

1. To understand the concept of indexing.
2. To get acquainted with different types of vocabulary control devices.
3. To get an insight into the provisions in a thesaurus and methodology of its constructions with reference application of computers.
4. To recognize different tools and techniques associated with the artificial intelligences based subject indexing systems.
5. To explore the strengths and weaknesses of different indexing techniques

UNITs	Descriptions	Hrs.
I	Cataloguing & Subject Indexing: Principles of Subject Cataloguing: Assigning Subject Heading Using Library of Congress Subject Heading & Sears List of Subject Heading Etc. Pre-& Post Co-Ordinate Indexing & Citation Indexing	8
II	Indexing Languages & Vocabulary Control: Indexing Languages: Types & Characteristics Vocabulary Control: Tools of Vocabulary Control Structure & Construction of an IR Thesaurus, Design and Development of IR Thesaurus Trends In Indexing Assigned Indexing Practice Derived Indexing Practice Formulation of Search Strategy Search Engines Federated Search Aggregators Subject Gateways	8
III	Information Retrieval: IR Models, Basic Models, Models Based On Theory, Tools And Recent Models; Search Strategies: Evaluation of Information Retrieval Systems; Trends In IR Models	8
IV	New Trends: Semantic Web, OWL (Ontology Web Language), Data Storage and Data Management – Features and contribution of AI (ML + DL), IoT in Intelligent Data Management.	8
V	Abstract & Abstracting: Concept, Purpose & Its Usefulness: Characteristics of Good Abstract Types Abstracting Procedure Standards & Guidelines For Preparing Abstract Automatic Abstracting	8
Total Hours		40

Course Outcomes:

CO1: Acquire knowledge on concepts and terminologies in Information Processing and Retrieval Theory.
CO2: Understand and apply various Indexing systems and Bibliographic Description

Standards.
CO3: Apply search strategies to locate and retrieve required information.
CO4: Differentiate the past, present and current practice of Information and Data Storage and Retrieval tools and techniques.
CO5: Understand the marketable value of information products and services.
CO6: Applies the principles, approaches and methods of marketing in the Library Environment.

Text Book & Reference Books-

1. Foskett (AC). The Subject Approach to Information. 4th Ed. London: Bingley, 1982.
2. Chowdhary (GG). Introduction to Modern Information Retrieval. 2nd Ed. London: Facet Publishing, 2003. Gopinath (MA). Construction of Depth Version of Classification: A Manual. New Delhi. Wiley Eastern Limited, 1986.
3. Gorman (GE) Ed. Meta Data Application for Management, London, Facet Publishing, 2003.
4. Harter (Stephen P.). Online Information Retrieval: Concept, Principles and Techniques, Orlando, Academic Press, 1978.
5. Hepas (ITS). Information Retrieval: Computational and Theoretical Aspects. New York, Academic Press. 1978.

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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_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							2	2	2
CO-4		2	3	3								3	3	3
CO-5		3	2	3								3	3	3
CO-6														

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program		B.Tech – IT					
Subject Category	DE-5	Subject Code:		IT 703 (B)	Subject Name	Optimization Technique					
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	0	4

Prerequisites:

Knowledge of Computer Programming Language and data structures.

Course Objective:

A) The focus of the course is on convex optimization though some techniques will be covered for non-convex function optimization too.

B) After an adequate introduction to linear algebra and probability theory, students will learn to frame engineering minima maxima problems in the framework of optimization problems.

UNITs	Descriptions	Hrs.
I	Mathematical preliminaries Linear algebra and matrices. Vector space, Eigen analysis. Elements of probability theory. Elementary multivariable calculus.	8
II	Linear Programming Simplex method, Introduction to linear programming model, Duality, Karmarkar's method.	8
III	Unconstrained optimization Conjugate direction and quasi-Newton methods, Gradient-based methods , One-dimensional search methods	8
IV	Constrained Optimization Lagrange theorem. FONC, SONC, and SOSC conditions.	8
V	Projection methods, KKT conditions, Non-linear constrained optimization models Nonlinear problems.	8
Total Hours		40

Course Outcomes:

CO-1: To implement optimization algorithms and model engineering minima/maxima problems as optimization problems.
CO-2: To understand the theory of optimization methods and algorithms developed for solving various types of optimization problem.
CO-3: To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.
CO-4: To study equality constraint.
CO-5: Explain the fundamental knowledge of Non-linear constrained optimization.

Text Book & Reference Books-

1. An introduction to Optimization by Edwin P K Chong, Stainslaw Zak.
2. Nonlinear Programming by Dimitri Bertsekas

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Modes of Evaluation and Rubric

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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	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year	VI/III	Program	B.Tech – IT
Subject Category: DE-5	Subject Code: IT 703 (C)	Subject Name	Pattern Recognition

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	0	4

Prerequisites:

Knowledge of Management Information System.

Course Objective:

A) To provide a Classifiers Based on Bayes Decision Theory.
B) To focus on Linear and Non Linear Classifiers
c) To enhance skills of features engineering.

UNITs	Descriptions	Hrs.
I	Classifiers Based on Bayes Decision Theory: Introduction , Bayes Decision Theory, Discriminant Functions and Decision Surfaces , Bayesian Classification ,Maximum Likelihood Parameter Estimation , Maximum a Posteriori Probability Estimation, Bayesian Inference , Maximum Entropy Estimation , Mixture Models , Nonparametric Estimation ,The Naive-Bayes Classifier , The Nearest Neighbor Rule, Bayesian Networks.	8
II	Linear Classifiers: Linear Discriminant Functions and Decision Hyperplanes, The Perceptron Algorithm, Least Squares Methods, Mean Square Estimation Revisited: , Logistic Discrimination, Support Vector Machines.	8
III	Non Linear Classifiers: XOR Problem, Two-Layer and Three Layer Perceptrons, Backpropagation Algorithm , Hyperparameters, Generalized Linear Classifiers, Capacity of the l-Dimensional Space in Linear Dichotomies, Polynomial Classifiers, Radial Basis Function Networks, Universal Approximators, Nonlinear SVM, Decision Trees, Boosting Approach to Combine Classifiers.	8
IV	Feature Selection:Preprocessing, Statistical Hypothesis Testing, The Receiver Operating Characterisitcs (ROC) Curve, Class Separability Measures, Feature Subset selection, Optimal Feature Generation, Neural Networks and Feature Generation / Selection, The Bayesian Information Criterion.	8
V	Feature Generation: Linear Transforms, Regional Features, Features for Shape and Size Characterization, Typical Features for Speech and Audio Classification Template Matching: Introduction, Similarity Measures Based on Optimal Path Searching Techniques, Measures Based on Correlations, Deformable Template Models.	8
Total Hours		40

Course Outcomes:

CO1 Determine classifiers based on Bayes theory for pattern recognition.
CO2 Use linear classifiers to identify the patterns of data.
CO3 Categorize the data using nonlinear classifier algorithms.
CO4 Employ statistical analysis to select optimal feature set.
CO5 Develop template matching module to recognize the patterns.

Text Book & Reference Books-

1 S Theodoridis and K Koutroumbas – Pattern Recognition, 4th Edition, Academic Press, 2009.

2 C Bishop – Pattern Recognition and Machine Learning – Springer, 2006.

3 R. O. Duda and P. E. Hart, D. G. Stork, "Pattern Classification", Wiley Interscience, Second Edition, 2007.

4 R. O. Duda and P. E. Hart, D. G. Stork, "Pattern Classification", Wiley Interscience, Second Edition, 2007.

5 J. P. Marques de Sá, "Pattern Recognition", Springer Science & Business Media , 2001.

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Modes of Evaluation and Rubric

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CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program			B.Tech – IT				
Subject Category	Proj	Subject Code:		IT 704	Subject Name		Major Project Prelim				
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
-	-	-	-	60	20	20	100	0	0	8	4

Prerequisites:

Knowledge of Computer Programming Language and MATLAB

Course Objective:

A) To study the image fundamentals and mathematical transforms necessary for image processing.
B) To study the image enhancement techniques.
C) To study image restoration procedures.
D) To study the image compression procedures.

UNITs	Descriptions	Hrs.
I	Digital Image Fundamentals: A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images.	8
II	Image Transformations Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.	8
III	Image Enhancement Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.	8
IV	Image Encoding and Segmentation Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques.	8
V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
Total Hours		40

Course Outcomes:

CO-1: Ability to apply principles and techniques of digital image processing in applications related to design and analysis of digital imaging systems. CO-2: Ability to analyze and implement image processing algorithms to real problems. CO-3: Gaining of hands-on experience in using software tools for processing digital images. CO-4: Interpret image segmentation and representation techniques. CO-5: Apply Mathematical Morphology using Polynomial approximation.

Text Book & Reference Books-

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Sonka, Digital Image Processing & Computer Vision, Cengage Learning.
3. Jayaraman, Digital Image Processing, TMH.
4. Pratt, Digital Image Processing, Wiley India.
5. Annadurai, Fundamentals of Digital Image Processing, Pearson Education.

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Modes of Evaluation and Rubric

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semester practical examination.

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CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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
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DEPARTMENT OF IT

Semester/Year		VII/IV		Program			B.Tech – IT				
Subject Category	PROJ	Subject Code:		IT 801	Subject Name		Major Project				
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
				300	200		500	0	0	20	10

Prerequisites:

Knowledge of Computer Programming Language and MATLAB

Course Objective:

A) To study the image fundamentals and mathematical transforms necessary for image processing.
B) To study the image enhancement techniques.
C) To study image restoration procedures.
D) To study the image compression procedures.

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V	Mathematical Morphology Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation	8
Total Hours		40

Course Outcomes:

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4. Pratt, Digital Image Processing, Wiley India.
5. Annadurai, Fundamentals of Digital Image Processing, Pearson Education.

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Modes of Evaluation and Rubric

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CO-1	3	3	2	3	1							2	3	1
CO-2		2	3	2	3									
CO-3	2	1	2	3	2								1	
CO-4		2	3	2								1		2
CO-5	2		2		2				1				1	

Suggestive list of experiments:

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

Course ID	Discipline	Course Name	SME Name	Institute	Co-ordinating Institute	Duration	Remarks
noc24-	Computer	Privacy and	Prof.	IIITH	IITM	12 weeks	

cs04	Science and Engineering	Security in Online Social Media	Ponnurangam Kumaraguru				
noc24-cs06	Computer Science and Engineering	Advanced Computer Architecture	Prof. Smruti Ranjan Sarangi	IITD	IITD	12 Weeks	
noc24-cs24	Computer Science and Engineering	Embedded System Design with ARM	Prof. Indranil Sengupta Prof. Kamalika Datta	IITKGP	IITKGP	8 Weeks	
noc24-cs26	Computer Science and Engineering	Foundation of Cloud IoT Edge ML	Prof. Rajiv Misra	IITP	IITK	8 Weeks	
noc24-cs34	Computer Science and Engineering	Introduction To Industry 4.0 And Industrial Internet Of Things	Prof. Sudip Misra	IITKGP	IITKGP	12 Weeks	
noc24-cs40	Computer Science and Engineering	Object Oriented System Development Using UML, Java And Patterns	Prof. Rajib Mall	IITKGP	IITKGP	12 Weeks	
noc24-cs52	Computer Science and Engineering	Reinforcement Learning	Prof. Balaraman Ravindran	IITM	IITM	12 Weeks	
noc24-cs62	Computer Science and Engineering	Probability for Computer Science	Prof. Nitin Saxena	IITK	IITK	8 Weeks	
noc24-cs65	Computer Science and Engineering	Business Intelligence & Analytics	Prof. Saji K Mathew	IITM	IITM	12 Weeks	
noc24-cs48	Computer Science and Engineering	Systems and Usable Security	Prof. Neminath Hubballi	IIT Indore	IITM	4 Weeks	
noc24-cs44	Computer Science and Engineering	Programming in Modern C++	Prof. Partha Pratim Das	IITKGP	IITKGP	12 Weeks	