



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Applied Science (Physics)

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|--|---|---------------|------------|---------------|----------|-----------------|---------------|------|---|---------------|
| 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 | L | T | P | |
| End Sem | Mid-Sem | Quiz | Assignment | End Sem | Lab-Work | | | | | |
| 60 | 20 | 10 | 10 | 30 | 20 | 150 | 3 | 0 | 1 | 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, Holography, 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 holography and can explain the characteristics, various losses, dispersion in optical fibers and processes of construction and reproduction 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 nanomaterials. The student 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 | | | |

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|--|---|----|--|
| | <p>levels. Mobility and carrier concentrations (intrinsic). Radiative and non-radiative recombination mechanisms in semiconductors .</p> <p>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.</p> | | |
| IV | <p>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.</p> <p>Nanomaterials: Basic principle of nanoscience and technology, structure, properties ad uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.</p> | 8 | |
| V | <p>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.</p> <p>Piezoelectric materials- Ferroelectric materials , Piezoelectric effect, direct and converse parameter definitions, Piezoceramics, Piezopolymers, Piezoelectric materials as sensor and transducers.</p> | 8 | |
| Guest Lectures (if any) | | | |
| Total Hours | | 40 | |
| Suggestive list of experiments: | | | |
| <ol style="list-style-type: none"> 1. To determine the width of a single slit from the study of Fraunhofer 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. | | | |
| <p>Text Book-</p> <ul style="list-style-type: none"> • 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 Sivaprashta, 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 | | | |
| <p>Reference Books-</p> <ul style="list-style-type: none"> • 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)
Computer Science and Engineering

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|--|--|---------------|--------|---------------|--|------|---------------|-----------------------------|-------------|---------------|---|
| Semester/Year | | | | Program | | | B.Tech. | | | | |
| Subject Category | ESC | Subject Code: | CSA101 | Subject Name: | Introduction to Computer Science and Engineering | | | | | | |
| Maximum Marks Allotted | | | | | | | | | | | |
| Theory | | Practical | | | | | Contact Hours | | | Total Credits | |
| End Sem | Mid-Sem | Assignment | Quiz | End Sem | Lab-Work | Quiz | Total Marks | 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: | | | | | | | | | | | |
| <ul style="list-style-type: none"> • 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 & associativity 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 | | | | | | | | | | | |
| <ol style="list-style-type: none"> 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) | | | | | | | | | | | |

Dr. Kanak Saxena
 Chairperson

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| <ol style="list-style-type: none"> 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- | |
| <ul style="list-style-type: none"> • Let us C By YashwantKanetkar, BPBPublication • Programming in C, SchaumOutline,McGraw-Hill | |
| Reference Books- | |
| <ul style="list-style-type: none"> • 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: | |
| <ol style="list-style-type: none"> 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 | CS & IT |
| Subject handled by department | CS & IT |

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Dr. Kanak Saxena
Chairperson



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS

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|---|---|---------------|---------|---------------|------------------------------|-----------------------------|------|---|---------------|
| Semester/Year | | I/I | | Program | | B.Tech – Internet of Things | | | |
| Subject Category | ESC | Subject Code: | IOA 103 | Subject Name: | Basic Electrical Engineering | | | | |
| Maximum Marks Allotted | | | | | | Contact Hours | | | Total Credits |
| Theory | | Practical | | | Total Marks | L | T | P | |
| End Sem | Mid-Sem | Quiz | End Sem | Lab-Work | | | | | |
| 60 | 20 | 20 | 30 | 20 | 150 | 3 | 0 | 2 | 04 |
| Prerequisites: | | | | | | | | | |
| Course Objective: | | | | | | | | | |
| <ol style="list-style-type: none"> 1. Familiarize with the basic concept of AC-DC Circuits and Machines 2. Impart the knowledge of Transformer and Rotating Machines 3. Concept of number system. 4. To explain the basic concepts of electronic devices. | | | | | | | | | |
| Course Outcomes: | | | | | | | | | |
| On successful completion of this course student should be able to: | | | | | | | | | |
| CO 1: Understanding of AC & DC circuits and its analysis using various theorems. | | | | | | | | | |
| CO 2: Understanding of Laws of electromagnetism, basic concepts and construction features of transformer. | | | | | | | | | |
| CO 3: Basic understanding of working and detail of DC machine, induction machine & synchronous machine. | | | | | | | | | |
| CO 4: Understanding of various electrical networks and finding its appropriate solution. | | | | | | | | | |
| UNITs | Descriptions | | | | | Hrs. | CO's | | |
| I | Unit-I: DC Circuits- Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff and Voltage laws, source conversion, DC circuits analysis using mesh & nodal method, Thevenin, Norton's, Maximum Power Transfer and Tellegen's Theorem, time domain analysis of first order RL and RC circuits. | | | | | 8 | CO1 | | |
| II | Unit-II: AC Circuits- Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections. | | | | | 8 | CO1 | | |
| III | Unit-III: Transformers- Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. | | | | | 8 | CO2 | | |
| IV | Unit-IV: Rotating Electric machines- Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss | | | | | 8 | CO3 | | |

Dr. Dhananjay V Gadre

Dr. N. P. Patidar

Mr. Satish Asani

Mr. Sudesh Morey

Prof. Vipin Patait

Dr. Divyarishi Sahu

Prof. Shafiq Chugh


Prof. C. S. Sharma


Dr. Ashutosh Datar


Dr. Jyotsna V Ogale

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| | components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators. | | |
| V | UNIT V: Introduction to Network: second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response. Representation of sine function as rotating phasor, phasor diagrams, impedances and admittances, AC circuit analysis, effective or RMS values, average power and complex power. Three-phase circuits. Introduction to two port network. | 8 | CO4 |
| Guest Lectures (if any) | | | |
| Total Hours | | 40 | |
| Suggestive list of experiments: | | | |
| <ol style="list-style-type: none"> 1. To verify Kirchoff's voltage law and Kirchoff's current law. 2. To verify Thevenin's, Norton's, Superposition and Maximum power transfer theorems in AC circuits. 3. To verify Tellegen's theorem in AC circuits. 4. To perform polarity test on single phase transformer. 5. To determine the transformation ratio of single phase transformer. 6. To conduct open circuit test on single phase transformer and calculate iron losses. 7. To conduct short circuit test on single phase transformer and calculate copper losses. 8. To perform load test on single phase transformer and determine voltage regulation and efficiency. To determine active power, reactive power, of single phase R-L series circuit. 9. To determine the armature circuit resistance series field winding resistant shunt field winding resistance of DC machines. 10. To determine line of 3 phase balanced and unbalanced Star. | | | |
| Text Book- | | | |
| <ul style="list-style-type: none"> • D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", TMH, 2010. • Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition • D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009. • M. E. Van Valkenburg, —Network Analysis], Prentice Hall, 2006 • D. Roy Choudhury, —Networks and Systems], New Age International Publications, 1998. | | | |
| Reference Books- | | | |
| <ul style="list-style-type: none"> • Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition • Hughes, Electrical and Electronic Technology, Pearson Education IX Edition | | | |
| Modes of Evaluation and Rubric | | | |
| List/Links of e-learning resource | | | |
| <ul style="list-style-type: none"> • https://nptel.ac.in/courses/108105053 | | | |


Dr. Dhananjay V Gadre


Dr. N. P. Patidar

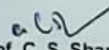

Mr. Satish Asani



Mr. Sudesh Morey



Prof. Vipin Patil


Dr. Divyarishi Sahu


Prof. Shaila Chugh


Prof. C. S. Sharma


Dr. Ashutosh Datar


Dr. Jyotsna V Ogale



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

| | | | | | | | | | | | |
|--|---|---------------|--------|---------------|---------------------|------|-------------|---------------|-------------|---|---------------|
| 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 | L | T | P | |
| End Sem | Mid-Sem | Assignment | Quiz | End Sem | Lab-Work | Quiz | | | | | |
| 60 | 20 | 10 | 10 | -- | -- | -- | 100 | 3 | 0 | 0 | 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: | | | | | | | | | | | |
| <ul style="list-style-type: none"> • 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 | | |

Dr. Kanak Saxena
 Chairperson

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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- | | | |
| <ul style="list-style-type: none"> • 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 | CS & IT | | |
| Subject handled by department | CS & 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 | L | T | P | |
| End Sem | Mid-Sem | Quiz | Assignment | End Sem | Lab-Work | | | | | 3 |
| 60 | 20 | 10 | 10 | - | - | 100 | 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: | | | | | | | | | | |
| <ol style="list-style-type: none"> 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: Leibnitz 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: | | | |
| <ol style="list-style-type: none"> 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

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|------------------|---------|---------------|----------------------|---------------|-------------------------------|
| 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 | L | T | P | |
| End Sem | Mid-Sem | Quiz | Assign- ment | End Sem | Lab- Work | Quiz | | | | | |
| 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 | <p>Understanding Harmony in the Human Being - Harmony in Myself!</p> <ol style="list-style-type: none"> 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 | <p>Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship</p> <ol style="list-style-type: none"> 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 | <p>Understanding Harmony in the Nature and Existence - Whole existence as Coexistence</p> <ol style="list-style-type: none"> 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 | <p>Implications of the above Holistic Understanding of Harmony on Professional Ethics</p> <ol style="list-style-type: none"> 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 | | |

H. G.
15/06/2022

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