



## School of Engineering & IT

# **MATS UNIVERSITY**

GULLU, ARANG, RAIPUR [C.G.]



### Program Outcomes (POs)

Engineering Graduates will be able to:

PO1	<b>Engineering knowledge</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	<b>Problem analysis</b>	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences, data and synthesis of the information to provide valid conclusions
PO3	<b>Design/development of solutions</b>	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	<b>Conduct investigations of complex problems</b>	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	<b>Modern tool usage</b>	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	<b>The engineer and society</b>	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	<b>Environment and sustainability</b>	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	<b>Ethics</b>	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	<b>Individual and team work</b>	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO10	<b>Communication</b>	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	<b>Project management and finance</b>	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	<b>Life-long learning</b>	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

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Arang-Kharora Highway,  
Raipur -493 441 (C. G.) INDIA

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# Scheme & Syllabus

(I<sup>st</sup> & II<sup>nd</sup> Semester)

## Bachelor of Technology

### Civil Engineering



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### Scheme of Teaching & Examination

#### B. TECH. I SEMESTER

S. No.	Code	Subject	Periods per week			Scheme marks of		Total Credit
			L	T	P	ESE	IM	
1.	BT100	Engineering Mathematics – I	3	1	-	70	30	4
2.	BT101	Engineering Physics	3	1	-	70	30	4
3.	BT102	Programming for Logic Building	3	0	-	70	30	3
4.	BT103	Engineering Graphics & Design	2	0	-	70	30	2
5.	BT104	Environmental Sciences	1	0	-	70	30	1
6.	BT105	Technical English	2	0	-	70	30	2
7.	BT106	Engineering Physics Laboratory	-	-	2	30	20	1
8.	BT107	Programming & Soft Skills Laboratory	-	-	2	30	20	1
9.	BT108	Engineering Graphics & Design Laboratory	-	-	4	30	20	2
10.	BT109	Communication Skills laboratory	-	-	2	30	20	1
11	BT 110	Manufacturing Practices – I Lab	-	-	4	30	20	2
Total			14	2	14	570	280	23

L – Lecture, T – Tutorial, ESE – End Semester Examination,  
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)



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SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Subject: Engineering Mathematics-I**

**Total Lecture + Tutorial Periods: 60**

**Total Credits: 04**

**Branch: All Streams of Engineering**

**Code: BT 100**

**Total Tutorial Periods: 01/week**

## **OBJECTIVES:**

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

## **UNIT-I**

### **MATRICES**

Real vector space, Subspace, Linear span, Linear dependence and linear independence of vectors, Basis, Dimension, Linear transformation, Matrix associated with a linear transformation, Rank and inverse by elementary transformation (Gauss Jordan method), System of linear equations, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Diagonalization of matrices.

## **UNIT- II**

### **DIFFERENTIAL CALCULUS**

Successive differentiation, Leibnitz theorem, Rolle's Theorem, Taylor's theorem with Lagrange's form of remainder, Expansions of functions in Taylor's and McLaurin's series



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### UNIT-III

#### PARTIAL DIFFERENTIATION

Functions of two variables: Limit, continuity and partial derivatives, derivatives of higher order, Euler's theorem on homogeneous functions, Total derivative, Change of variables, Jacobians, Maxima, minima and saddle points of functions of two variables

### UNIT-IV

#### ORDINARY DIFFERENTIAL EQUATION

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations of first order and higher degree: equations solvable for  $p$ , equations solvable for  $y$ , equations solvable for  $x$  and Clairaut's type.

Ordinary differential equations of higher order linear differential equations with constant coefficients & variable coefficients, method of variation of parameters, Cauchy-Euler equation, Legendre polynomials and their properties

### UNIT-V

#### MULTIPLE INTEGRAL

Beta and Gamma functions – elementary properties, Double and triple integrals, change of order of integration, Application to area and volume.

#### OUTCOMES:

- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

#### NAME OF TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (42th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

#### NAME OF REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3. Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-II –Pune VidyarthiGrihaPrakasan, Pune.
4. Integral Calculus by Gorakh Prasad-Pothisala Private Limited.



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**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Subject: Engineering Physics**

**Total Lecture + Tutorial Periods: 60**

**Total Credits: 04**

**Branch: All Streams of Engineering**

**Code: BT101**

**Total Tutorial Periods: 01/Week**

### **OBJECTIVES:**

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

### **Unit -I**

#### **THEORY OF RELATIVITY SPACE**

Time and motion, frame of reference, Galilean Transformation Outline of relativity, Michelson-Morley experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect, length contraction, addition of velocities, Relativistic mass: variation of mass with velocity, kinetic energy, equivalence of mass and energy, Relation between energy and momentum.

### **Unit- II**

#### **(a) LASERS**

Temporal and spatial coherence of light wave Principle of laser, Laser characteristics, components of laser, Principle of Ruby, He-Ne & Nd-YAG lasers, application, basic concepts of Holography (only introductory part, No detail derivation)

#### **(b) FIBRES OPTICS:**

Optical fibers: Introduction & advantages, structure & classification, Option of propagation in fiber, attenuation & distortion, acceptance angle and cone, numerical aperture (only introductory part, No detail derivation).

### **Unit -III**

#### **NUCLEAR PHYSICS**

Controlled and uncontrolled chain reaction, criteria of critical mass, nuclear reactor and its site selection & numerical, nuclear forces, Nuclear fusion in stars. Introduction of



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elementary particles. Electron ballistic: Motion of charged particles in electric and magnetic field. Aston and Bainbridge mass spectrograph.

### Unit -IV

#### WAVE OPTICS

Wedge shaped films, Interferences by division of amplitude: Newton's rings and its applications Interference by division of wave front: Fresnel's bi prism, fringe width, diffraction grating, resolving power of grating,

### Unit- V

#### SOLID STATE DEVICES:

Transistor: Input and Output characteristics in CE mode, Transistor as an amplifier, Hartley Oscillator. FET: Input and output characteristics of J-FETs & MOSFETs, Operational amplifiers (Op-Amp).

#### OUTCOMES:

The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

#### TEXT BOOKS:

1. Gaur and Gupta "Engineering Physics"
2. Avadhanulu and Kshirsagar "Engineering Physics".
3. Verma H.C.: Concepts of Physics, Part-1 & Part-2, BharatiBhawan (P&D)
4. A.K. Tayal: Engineering Mechanics (Statics and Dynamics)

#### REFERENCE BOOKS:

- Jenkins and White: "Optics", McGraw-Hill Book Company.
- Singh R.B.: "Physics of Oscillations and Waves"
- Ghatak A.K.: "Optics"
- Mani and Mehta: "Modern Physics", Affiliated East-West Press Pvt. Ltd, 1998.
- Sanjeev Puri: Modern Physics, narosa Pub. Co.2004.
- Azroff: Solid State Physics, Tata McGraw-Hill, 2004.
- Theraja: B.L., Basic Electronics, S.Chand, 2002.
- Puri: Digital Electronics, Tata McGraw-Hill, 2002.
- Millman, J and Halkias: integrated Electronics, Tata McGraw-Hill, 2004.
- Tyagrajan and Ghatak: Lasers, Macmillan, 2001. •





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**MATS UNIVERSITY, RAIPUR (C.G.)  
SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Subject: Programming For Logic Building**

**Total Theory Periods: 48**

**Total Credits: 03**

**Branch: All Streams of Engineering**

**Subject Code: BT 102**

**Total Tutorial Periods: 00**

## **COURSE OBJECTIVE:**

- To distinguish and recognize low-level and high-level programming languages
- To know fundamental concepts of structured programming
- To understand logic development
- To design pseudo logic for various programming problems.
- To understand the basic structure of a program including sequence, decisions and looping.
- To design solutions to real world problems using C language.
- To use C language for problem solving and numerical computations.
- To apply computer-programming concepts to new problems or situations.

## **UNIT – I**

### **ELEMENTS OF C LANGUAGE**

Tools for Problem Solving: Problem Analysis, Flowchart, Algorithm Development. Top-Down Program Design, Structured Design Approach, Origin of C, Features & Characteristic of C, C Compiler, Character Set, Keywords, Identifiers, Constants, Variables, Input/ Output Statements, Basic Data Types, Operators and Expressions, Basic structure of C programs, A simple C Program.

## **UNIT – II**

### **CONTROL FLOW CONSTRUCTION**

Decision making and branching: Simple if statement, if else statement, Nesting of if-else statement, else - if Ladder, Switch statement, Operator, goto statement, Decision making and looping, While statement, Do-While statement, For statement, Jumps in loops, Break and Continue statement.

## **UNIT – III**

### **DEFINING AND MANIPULATING ARRAYS**

One Dimensional Arrays: Declaration of Arrays, Initialization of Arrays, Reading and Writing of integer, real and Character arrays, sorting and Searching in Arrays, Multi-Dimensional Arrays, Handling of Character Strings.





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### UNIT – IV

#### USER DEFINED FUNCTIONS

Syntax of Function, Calling functions, Actual & Formal Arguments, Categories of Functions, Function prototype, Scope Rules: Local & Global variables, Recursion, Recursion vs. iteration, Passing Arguments: call by values & call by reference, passing array to function.

**Structures:** Declaration and initialization of Structure, Array of structures, Array within structure, structure within structure, Structures and functions, Introduction to unions.

### UNIT – V

#### POINTER DATA TYPE AND ITS APPLICATION

Pointer Operator, Pointer Expression, Initialization of pointers, Pointer Arithmetic, Pointer and Function Arguments, Pointer to function, Pointer and Arrays, Pointers and String, Arrays of Pointers, Pointers to Pointers, Dynamic memory allocation.

**Files in C:** Defining and Opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, Random access to files.

#### COURSE OUTCOME:

After completion of the course study, students are going to be in a position to

- Analyze issues and style algorithms in pseudo code.
- Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
- Read, perceive and trace the execution of programs written in C language.
- Develop confidence for self-education and ability for life-long learning needed for Computer language.
- Write down C program for a given algorithm by means of modular approach.

#### TEXT BOOKS:

1. The C programming Language, Dennis M Ritchie and Kernighan, PHI.
2. Let us C, Yashwant Kanetkar, BPB Publication.
3. Programming in C, E. Balaguruswamy, TMH.

#### REFERENCE BOOKS:

1. Programming in C, Byron Gottfried, Schaum's series outline TMH.
2. Programming in C, Ghosh, PHI.
3. Computer Programming in C, V. Raja Raman, PHI.



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**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Branch: All Streams of Engineering**

**Subject: Engineering Graphics and Design**

**Code: BT 103**

**Total Theory Periods: 28**

**Total Tutorial Periods: 00**

**Total Credits: 02**

### **OBJECTIVES:**

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

### **UNIT – I**

**a) IMPORTANCE OF ENGINEERING DRAWING:** Scales: Representative Fraction, Type of Scale, Plain and Diagonal Scale.

**b) ENGINEERING CURVES:** Conic section, Ellipse, parabola, hyperbola, Cycloidal Curves: Cycloid, Epicycloids, Hypocycloid and Involute.

### **UNIT – II**

**a) PROJECTION:** Introduction, Principle of Projection, method of projection, planes of projection, four quadrants, first and third angle projection and reference line symbols for methods of projection, Orthographic projection.

**b) PROJECTION OF POINTS:** Introduction point situated in first, second, third & fourth quadrant. Projection of lines: Introduction, line parallel to one or both the planes, line contained by one or both the planes, line perpendicular to one of the planes, line inclined to one plane and parallel to other. Line inclined to both the planes. [Simple problems only]

### **UNIT – III**

**a) PROJECTIONS OF PLANES:** Introduction, types of planes, projection of planes, projection of planes perpendicular to both the reference planes, perpendicular to one plane and parallel to the other plane, perpendicular to one plane and inclined to the other plane.

**b) PROJECTIONS OF SOLIDS:** Introduction, types of solids, projections of solids in simple position, projections of solids with axes inclined to one of the reference planes and parallel to the other, projections of solids with axes inclined to both H.P. and the V.P., section planes, types of sections, true shape of section, section of solids.

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### UNIT – IV

a) **DEVELOPMENT OF SURFACES:** Introduction, methods of development, development of lateral surfaces of right solids, cube, prisms, cylinders, pyramids & cone.

b) **ISOMETRIC PROJECTION:** Introduction, Isometric axes, lines & planes, Isometric scale, Isometric projection and Isometric view of simple objects.

### UNIT – V

**COMPUTER AIDED DRAWING:** Introduction to CAD, benefits and limitation of CAD, CAD Software's, AutoCAD introduction, Basic Commands of AutoCAD, Concept of Layers, Dimensioning and text, Creation of two dimensional drawing.

### OUTCOMES:

On Completion of the course the student will be able to

- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting.

### TEXT BOOKS:

- (i) Bhatt, N.D., "Elementary Engineering Drawing", Charotar Book Stall, Anand
- (ii) George Omura, "Mastering AutoCAD" B.P.B. Publication, New Delhi

### REFERENCE BOOKS:

- (i) Engineering Graphics – Laxminarayanan V. and Vaishwanar, R.S. Jain Brothers, New Delhi
- (ii) Engineering Graphics – Chandra, AM & Chandra Satish 1998.
- (iii) Engineering Graphics – K.L. Narayan and P. Kannaih, Tata McGraw Hill
- (iv) A Text book of Engineering Drawing (Plane & Solid Geometry) – N.D. Bhatt & V.M. Panchal, Charotar Publishing House
- (v) The Fundamental of Engineering Drawing and Graphics Technology – French and Vireck, McGraw Hill.



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**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B. Tech**

**Subject: Environmental Sciences**

**Total Theory Periods: 15**

**Total Credits: 01**

**Branch: All Streams of Engineering**

**Code: BT 104**

**Total Tutorial Periods: 00**

### **OBJECTIVES**

- To create and disseminate knowledge to the students about environmental problems at local, regional and global scale.
- To provide practical training on modern instrumentation and analytical techniques for environmental analyses.
- To sensitize students towards environmental concerns, issues, and impacts of climate change and related mitigation strategies.
- To make the students to apply their knowledge for efficient environmental decision-making, management and sustainable development.
- To prepare students for successful career in environmental departments, research institutes, industries, consultancy and NGOs, etc.

### **UNIT-I:**

#### **CONCEPTS OF ENVIRONMENTAL SCIENCES AND NATURAL RESOURCES**

Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals. Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternative).

### **UNIT-II:**

#### **BIODIVERSITY AND ITS CONSERVATION**

Biodiversity at global, national and local levels: India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation.

### **UNIT-III:**

#### **ENVIRONMENTAL POLLUTION**

Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with



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case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

### **UNIT-IV:**

#### **ENVIRONMENTAL BIOTECHNOLOGY AND ENVIRONMENTAL MONITORING**

Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phyto-remediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil sampling techniques.

### **UNIT-V:**

#### **SOCIAL ISSUES AND ENVIRONMENT**

Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with one case study; Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics.

### **OUTCOMES**

- After completion of the course, the students have:  
Acquired fundamental knowledge of different aspects of environment and local, regional and global environmental problems.
- Developed environmental monitoring skills, including conduct of experiments and data analysis.
- Obtained exposure to the environmental pollution control technologies.  
Acquired the knowledge and skills needed for the environmental design and management.
- Acquired skills in the preparation, planning and implementation of environmental projects.

### **TEXTBOOKS:**

1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd Edition, Pearson Education, 2004.
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.



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### **REFERENCE BOOKS:**

1. A. K. Chatterji, “Introduction to Environmental Biotechnology”, Prentice Hall of India, New Delhi, 2006.
2. R.K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media.
3. Nebel B. J., “Environmental Science”, Prentice Hall of India, New Delhi, 1987.



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**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Subject: Technical English**

**Total Theory Periods: 28**

**Total Credits: 02**

**Branch: All Streams of Engineering**

**Code: BT 105**

**Total Tutorial Periods: 00**

### **OBJECTIVES:**

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

### **UNIT-I**

Technical vocabulary-meaning in context, sequencing words, articles, prepositions, intensive reading and predicting content-reading and interpretation- process description.

### **UNIT-II**

Phrases/structures indicating use/purpose- nonverbal communication- listening- correlating verbal and nonverbal communication-speaking in group discussion- formal letter writing- writing analytical paragraphs.

### **UNIT III**

Cause and effect expressions- different grammatical forms of the same word- speaking stress and intonation- writing using connectives- report writing- types, structures, data collection, content form recommendation.

### **UNIT –IV**

Numerical adjectives- oral instructions- descriptive writings, letter of application-content, format (c.v./biodata)-imperative forms –checklists, yes/no question forms- e mail communication.





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### UNIT-V

Speaking – discussion of problems and solutions- creative and critical thinking, writing a proposal.

### OUTCOMES:

Learners should be able to

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.

Listen/view and comprehend different spoken discourses/excerpts in different accents.

### BOOKS AND REFERENCES:

1. P.k. dutta, g. Rajeevan and c.l.n.prakash, 'a course in communication skills,. Cambridge university press, india2007
2. Krishna mohan and meerabanerjee, 'developing communication skills' Macmillan india limited
3. Edger throe, showickthroe, 'objective english' second edition,pearson education,2007



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**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech.**

**Lab: Engineering Physics Laboratory**

**Total Practical Periods: 28**

**Branch: All Streams of Engineering**

**Code: BT 106**

**Total Credit: 01**

### **OBJECTIVES:**

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

### **OUTCOMES:**

- The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

### **LIST OF EXPERIMENTS** (Any ten experiments can be performed)

1. To determine the surface tension by Capillary/Jager's method.
2. To determine the wave length of light by Newton's rings method.
3. To determine the wave length of light by Fresnel's Biprism.
4. To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
5. To determine specific resistance of a wire by Carry Foster's Bridge.
6. To determine the Hall coefficient of semiconductor.
7. To determine  $e/m$  by Thomson's method.
8. Study of Photo – Cell and determination of Planck's constant.
9. Determination of wavelength of a spectral line using diffraction grating.
10. Determination of divergence of LASER beam.
11. Determination of grating element of a diffraction grating using LASER beam.
12. To determine the coefficients of viscosity of a liquid by capillary flow/Stoke's method.
13. To determine the frequency of A.C. mains using sonometer.
14. To determine the moment of inertia of flywheel.
- 15 To determine the forbidden energy gap of semiconductor diode.
16. To determine the mechanical equivalent of heat (J) by Calender&Barne's method.
17. To determine the numerical aperture (NA) of the given fiber cables.
18. To study the characteristics of LDR.



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**MATS UNIVERSITY, RAIPUR (C.G.)**  
**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech.**

**Lab: Programming & Soft Skills laboratory**

**Total Practical Periods: 28**

**Branch: All Streams of Engineering**

**Code: BT 107**

**Total Credits: 01**

### **List of Programs:**

- 1 Write a program to take the radius of a sphere as input and print the volume and surface area of that sphere.
- 2 Write a program to take a 5-digit number as input and calculate the sum of its digits.
- 3 Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene Oran equilateral triangle.
- 4 Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
- 5 Write a program to print all the Prime numbers between a given ranges.
- 6 Write a program to define a function that will take an integer as argument and return the sum of digits of that integer.
- 7 Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
- 8 Write a program to define a recursive function that will print the reverse of its integer argument.
- 9 Write a program to print the sum of first N even numbers using recursive function.
- 10 Write a program to sort an array using Bubble sort technique.
- 11 Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)
- 12 Write a program to take 5 names as input and print the longest name.
- 13 Write a program to check whether two given strings are palindrome or not using user defined function.
- 14 Write a program to find sum of all array elements by passing array as an argument using user define functions.
- 15 Write a program to convert decimal number to binary number using the function.



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- 16 Write a program to get the largest and smallest element of an array using the function.
- 17 Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of 5 students and print the details of all the students whose total marks is greater than a given value.
- 18 Write a program to define a union Contact that will contain the members Mobile no and E-mail id. Now define structure Employee that will contain name, roll number, mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact num/ E-mail. Print the details of both the Employees.
- 19 Write a program to count vowels and consonants in a string using pointer.
- 20 Write a program to swap two numbers using pointers.
- 21 Write a program to find sum of array elements using Dynamic Memory Allocation.
- 22 Write a program that will ask the user to input a file name and copy the contents of that file into another file.
- 23 Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.
- 24 Write a program to process sequential file for payroll data.
- 25 Write a program to process random file of library data.

### **Smart Working with MS-Office**

#### **MS-Word**

- a) Creating, editing, saving and printing text documents
- b) Font and paragraph formatting
- c) Simple character formatting
- d) Inserting tables, smart art, page breaks
- e) Using lists and styles
- f) Working with images
- g) Using Spelling and Grammar check
- h) Understanding document properties
- i) Mail Merge



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



### MS-Excel

- a) Spreadsheet basics
- b) Creating, editing, saving and printing spreadsheets
- c) Working with functions & formulas
- d) Modifying worksheets with color & auto formats
- e) Graphically representing data : Charts & Graphs
- f) Speeding data entry : Using Data Forms
- g) Analyzing data : Data Menu, Subtotal, Filtering Data
- h) Formatting worksheets
- i) Securing & Protecting spreadsheets

### MS-PowerPoint

- a) Opening, viewing, creating, and printing slides
- b) Applying auto layouts
- c) Adding custom animation
- d) Using slide transitions
- e) Graphically representing data : Charts & Graphs
- f) Creating Professional Slide for Presentation.

### LIST OF EQUIPMENT'S / MACHINE REQUIRED:

PCs, C-Compiler, C Online Compiler, Microsoft Office (version 2007 or above)

### REFERENCES:

1. Programming in ANSI C – E. Balaguruswamy Tata Mc-Graw Hill.
2. Let us C, Yashwant Kanetkar, BPB Publication
3. C: The Complete Reference, Herbert Schildt, McGraw Hill.
4. Office 2007 for Dummies, Wallace Wang, Wiley Publishing
5. MS-Office 2010 Training Guide, Satish Jain/M.Geeta/Kratika, BPB Publications



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Branch: All Streams of Engineering**

**Lab: Engineering Graphics and Design Laboratory**

**Code: BT 108**

**Total Practical Periods: 60**

**Total Credits: 02**

### LIST OF EXPERIMENTS

#### Component-1

Sheet-1: Projection of Solids (4 problems) + Section and Development of solid surfaces (4 problems) Sheet -2: Orthographic projection without section (4 problems).

Sheet -3: Orthographic projection with section (4 problems). Sheet- 4: Isometric Projections (6 problems).

#### Component -2

One A-3 size sketch book consisting of:-

- 1) 6 problems each from Projection of Curves, Lines, Planes and Solids.
- 2) 6 problems from Section and Development of Solids.
- 3) 4 problems each from the Orthographic Projections (with Section), Reading of orthographic projections and Isometric projections.

#### Component - 3

1. An introduction of cad software and its utilities in the engineering software.
2. Study of the basic initial setting and viewing of drafting software interface.
3. Study of various tool bar options and exercises to familiarize all the drawing tools.
4. Use of various modify commands of drafting software.
5. Dimensioning in 2d and 3d entities.
6. Draw different types of 3d modeling entities using viewing commands, to view them (isometric projection).
7. Sectioning of solid primitives and rendering in 3d.
8. Intersection of solid primitives.



# **MATS UNIVERSITY**

## **ARANG, RAIPUR (C.G.)**



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: I B.Tech**

**Lab: Communication & Soft Skills Laboratory**

**Total Practical Periods: 28**

**Branch: All Streams of Engineering**

**Code: BT 109**

**Total Credits: 01**

### **LIST OF TASKS:**

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication: Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing.
6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills
7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective
8. Interview Skills – formal & informal interviews, concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing
9. Writing Skills - Business Communication, Essays for competitive examinations.
10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.





# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



### MATS UNIVERSITY, RAIPUR (C.G.)

### SCHOOL OF ENGINEERING & I.T.

**Semester: I B.Tech**

**Lab: Manufacturing Practices -I Laboratory**

**Total Practical Periods: 45+ (15 Instructional Periods)**

**Branch: All Streams of Engineering**

**Code: BT 110**

**Total Credits: 02**

### INSTRUCTIONAL SYLLABUS

#### **Carpentry:**

Timber, definition, engineering applications, seasoning and preservation, plywood and ply boards.

#### **Foundry:**

Moulding sands, constituents and characteristics. Pattern, definition, materials, types, core prints. Role of gate, runner, riser, core and chaplets. Causes and remedies of some common casting defects like blow holes, cavities, inclusions.

#### **Welding:**

Definitions of welding, brazing and soldering processes, and their applications, Oxyacetylene gas welding process, equipment and techniques, type of flames and their applications. Manual metal arc welding technique and equipment, AC and DC welding, electrodes, constituents and functions of electrode coating, Welding positions. Type of weld joint. Common welding defects such as cracks, undercutting slag inclusion, porosity.

### LIST OF EXPERIMENTS

1. T-Lap joint and Bridle joint (Carpentry shop)
2. Mould of any pattern (foundry shop)
3. Casting of any simple pattern (foundry shop)
4. (a) Gas welding practice by students on mild steel flat  
(b) Lap joint by Gas welding
5. (a) MMA Welding practice by students  
(b) Square butt joint by MMA Welding
6. (a) Lap joint by MMA Welding  
(b) Demonstration of brazing



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ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY**  
**SCHOOL OF ENGINEERING & I.T.**  
**SCHEME OF TEACHING AND EXAMINATION SESSION 2022-23**  
**B. TECH.II – SEMESTER**

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT200	Engineering Mathematics –II	3	1	-	70	30	4
2.	BT201	Engineering Chemistry	3	-	-	70	30	3
3.	BT202	Basic Electrical & Electronics Engineering	3	-	-	70	30	3
4.	BT203	Object Oriented Programming	3	-	-	70	30	3
5.	BT204	Constitution of India, Professional Ethics and Human Rights	1	-	-	70	30	1
6.	BT205	Professional Elective	3	-	-	70	30	3
	BT2051	Fundamental of Mechanical Engineering ( For Aero/Mech/Mining/Civil)						
	BT2052	Introduction to Scripting ( For CSE/Elex/Electrical)						
7.	BT206	Engineering Chemistry Laboratory	-	-	2	30	20	1
8.	BT207	Basic Electrical & Electronics Engineering Laboratory	-	-	2	30	20	1
9.	BT208	Advance Programming Laboratory	-	-	2	30	20	1
10.	BT209	Professional Elective Laboratory	-	-	2	30	20	1
	BT2091	Fundamental of Mechanical Engineering Laboratory ( For Aero/Mech/Mining/Civil)						
	BT2092	Java Script Laboratory ( For CSE/Elex/Electrical)						
11.	BT210	Manufacturing Practices – II Laboratory	-	-	4	30	20	2
<b>Total</b>			<b>16</b>	<b>1</b>	<b>12</b>	<b>570</b>	<b>280</b>	<b>23</b>

L – Lecture, T – Tutorial, ESE – End Semester Examination,  
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessment)

**MATS School of Engineering & I.T**



# MATS UNIVERSITY

ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)  
SCHOOL OF ENGINEERING & I.T.**

**Semester: II B.Tech**

**Branch: All Streams of Engineering**

**Subject: Engineering Mathematics-II**

**Subject Code: BT 200**

**Total Lecture + Tutorial Periods: 60**

**Total Credits: 04**

## **OBJECTIVES:**

- To make the scholars perceive the series analysis could be a powerful methodology wherever the formulas square measure integrals and to possess information of increasing periodic functions that explore sort of applications of Fourier series.
- To possess intensive information of PDE those arise in mathematical descriptions of things in engineering. To review a few amount which will take any of a given vary of values that will not be foreseen because it is however can be delineated in terms of their likelihood.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To produce a sound background of advanced analysis to perform an intensive investigation of major theorems of complex analysis and to use these ideas to a large vary of issues that features the analysis of each complex line integrals and real integrals.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

## **UNIT I**

### **FOURIER SERIES**

Fourier series, Even odd function, Half range sine and cosine series, Parseval's theorem, practical harmonic analysis & Fourier Transform

## **UNIT II**

### **PARTIAL DIFFERENTIAL EQUATION**

Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables & application of PDE

## **UNIT III**

### **COMPLEX ANALYSIS**

Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, Residue



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



### UNIT IV

#### LAPLACE TRANSFORMATION

Definition, Transform of elementary functions, Properties of Laplace transform, of derivatives & integrals, Multiplication by  $tn$ , Division by  $t$ , Evaluation of integrals, Inverse Laplace function, Convolution theorem, Unit step functions, Unit impulse function, periodic function. Application to solution of ordinary differential equations

### UNIT V

#### VECTOR CALCULUS

Directional derivative, Gradient, Divergence and curl, Line, Surface and Volume integrals, Green's, Gauss's & Stoke's theorem (without proof) and applications

#### OUTCOMES:

The subject helps the students to develop the fundamentals and basic concepts in vector calculus, PDE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

#### TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (40th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

#### REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3. Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-II –Pune VidyarthiGrihaPrakasan, Pune



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T**

**Semester: II B. Tech**  
**Subject: Engineering Chemistry**  
**Total Theory Periods: 48**  
**Total Credits: 03**

**Branch: All Streams of Engineering**  
**Code: BT 201**  
**Total Tutorial Periods: 00**

### **OBJECTIVES:**

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels

### **UNIT-I:**

#### **(a) ELECTROCHEMISTRY AND BATTERY TECHNOLOGY ELECTROCHEMISTRY:**

Introduction, Derivation of Nernst equation for electrode potential. Reference electrodes: Introduction, construction, working and applications of calomel and Ag / AgCl electrodes. Measurement of electrode potential using calomel electrode. Ion selective electrode: Introduction; Construction and working of glass electrode, determination of pH using glass electrode. Concentration cells: Electrolyte concentration cells, numerical problems.

#### **(b) BATTERY TECHNOLOGY:**

Introduction, classification - primary, secondary and reserve batteries. Characteristics - cell potential, current, capacity, electricity storage density, energy efficiency; cycle 10 hours life and shelf life. Construction, working and applications of Zinc Air, Nickel- metal hydride batteries. Lithium batteries: Introduction, construction, working and applications of Li-MnO<sub>2</sub> and Li-ion batteries.

#### **(c) FUEL CELLS:**

Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with H<sub>2</sub>SO<sub>4</sub> electrolyte.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



### UNIT-II:

#### (a) CORROSION AND METAL FINISHING CORROSION:

Introduction, electrochemical theory of corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium – pH, conductivity, and temperature. Types of corrosion- Differential metal, differential aeration (Pitting and water line) and stress. Corrosion control: Inorganic coatings Anodizing of Al and phosphating; Metal coatings-Galvanization and Tinning. Cathodic protection (sacrificial anodic and impressed current methods).

#### (b) METAL FINISHING:

Introduction, Technological importance. Electroplating: Introduction, principles governing-Polarization, decomposition potential and overvoltage. Factors influencing the nature of electro deposit-current density, concentration of metal ion & electrolyte; pH, temperature & throwing power of plating bath; additives- brighteners, levelers, structure modifiers & wetting agents. Electroplating of Nickel (Watt's Bath) and Chromium (decorative and hard). Electro less plating: Introduction, distinction between electroplating and electro less plating, electro less plating of copper & manufacture of double sided Printed Circuit Board with copper.

### UNIT-III:

#### (a)FUELS AND SOLAR ENERGY FUELS:

Introduction, classification, calorific value- gross and net calorific values, determination of calorific value of fuel using bomb calorimeter, numerical problems. Cracking: Introduction fluidized catalytic cracking, synthesis of petrol by Fischer-Tropsch process, reformation of petrol, octane and cetane numbers. Gasoline and diesel knocking and their mechanism, anti-knocking agents, power alcohol & biodiesel.

#### (b)SOLAR ENERGY:

Introduction, utilization and conversion, photovoltaic cells- construction and working. Design of PV cells: modules, panels & arrays. Advantages & disadvantages of PV cells. Production of solar grade silicon: Union carbide process, purification of silicon (zone refining), doping of silicon-diffusion technique (N&P types).

### UNIT-IV:

#### POLYMERS:

Introduction, types of polymerization: addition and condensation, mechanism of polymerization- free radical mechanism taking vinyl chloride as an example. Molecular weight of polymers: number average and weight average, numerical problems. Glass transition temperature (T<sub>g</sub>): Factors influencing T<sub>g</sub>- Flexibility, inter molecular forces, molecular mass, branching & cross linking and stereo regularity. Significance of T<sub>g</sub>. Structure property relationship: crystallinity, tensile strength, elasticity & chemical resistivity. Synthesis, properties and applications of PMMA (plexi glass), Polyurethane and polycarbonate. Elastomers: Introduction, synthesis, properties and applications of Silicone rubber.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



Adhesives: Introduction, synthesis, properties and applications of epoxy resin. Polymer Composites: Introduction, synthesis, properties and applications of Kevlar. Conducting polymers: Introduction, mechanism of conduction in Poly aniline and applications of conducting poly aniline.

### UNIT-V:

#### WATER TECHNOLOGY AND NANOMATERIALS

##### (a)WATER TECHNOLOGY:

Introduction, boiler troubles with disadvantages & prevention methods-scale and sludge formation, priming and foaming, boiler corrosion (due to dissolved O<sub>2</sub>, CO<sub>2</sub> and MgCl<sub>2</sub>). Determination of DO, BOD and COD, numerical problems on COD. Sewage treatment: Primary, secondary (activated sludge method) and tertiary methods. Softening of water by ion exchange process. Desalination of sea water by reverse osmosis & electro dialysis (ion selective).

##### (b)NANO MATERIALS:

Introduction, properties (size dependent). Synthesis-bottom up approach (sol-gel, precipitation, gas condensation & chemical vapour condensation processes). Nano scale materials- carbon nano tubes, nano wires, fullerenes, dendrimers, nano rods, & nano composites.

#### OUTCOMES:

- The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

#### TEXTBOOKS:

1. B.S.Jai Prakash, R.Venugopal, Sivakumaraiah&PushpaIyengar., “Chemistry for Engineering Students”, Subhash Publications, Bangalore.
2. R.V.Gadag&A.Nityananda Shetty., “Engineering Chemistry”, I K International Publishing House Private Ltd. New Delhi.
3. P.C.Jain& Monica Jain., “Engineering Chemistry”, Dhanpat Rai Publications, New Delhi.

#### REFERENCE BOOKS:

1. O.G.Palanna, “Engineering Chemistry”, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint.
2. G.A.Ozin& A.C. Arsenault, “Nano chemistry A Chemical Approach to Nanomaterials”, RSC publishing, 2005.
3. “Wiley Engineering Chemistry”, Wiley India Pvt. Ltd. New Delhi. Second Edition.
4. V.R.Gowariker, N.V.Viswanathan&J.Sreedhar., “Polymer Science”, Wiley-Eastern Ltd.
5. M.G.Fontana., “Corrosion Engineering”, Tata McGraw Hill Publishing Pvt. Ltd. New Delhi





# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T**

**Semester: II B. Tech**

**Subject: Basic Electrical & Electronics Engineering**

**Total Theory Periods: 48**

**Total Credits: 03**

**Branch: All Streams of Engineering**

**Code: BT 202**

**Total Tutorial Periods: 00**

### **COURSE OBJECTIVES**

- Understand the basic concepts of DC and AC circuits.
- Analyse the series, parallel and series, parallel ac circuits.
- Acquire knowledge about working principle, construction and losses of a transformer.
- Understand the working, characteristics and applications of diodes.
- Understand the construction, working, characteristics and applications of a transistor.

### **Unit – I**

#### **D.C. Networks:**

Elementary idea about power generation, transmission and distribution. Node voltage and mesh current method. Superposition, Thevenin's and Norton's theorems. Star- delta and Delta- star conversions.

### **Unit – II**

#### **Single Phase A.C. Circuits:**

Single phase EMF generation, Effective & Average values of sinusoids and determination of form-factor, Analysis of simple series R-L, R-C and RLC circuits, power and power factor

### **Unit – III**

#### **(a) Three Phase AC circuits:**

Introduction, Generation of Three-phase EMF, Phase sequence, Connection of Three-phase Windings - Delta and Star connection: Line and Phase quantities, phasor diagrams, Power equations in balanced conditions.

#### **(b)Magnetic Circuits:**

Introduction, Magneto motive force (MMF), Magnetic field strength, Reluctance, B-H curve, Comparison of the Electric and Magnetic Circuits, Series-Parallel Magnetic Circuit, Leakage flux and fringing, Magnetic Hysteresis, Eddy currents.



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## ARANG, RAIPUR (C.G.)



### Unit – IV

#### (a)Single phase Transformers:

Introduction, Principles of operation, Constructional details, Ideal Transformer and Practical Transformer, EMF equation, Rating, Phasor diagram on no load, Losses, Efficiency calculations.

#### (b)Direct current machines:

Basic concepts and elementary idea of AC and DC machines, construction and working principal of DC Generator, emf and torque equation dc machine and types of dc motor.

### Unit – V

#### (a)Semiconductor Devices and Applications

Introduction - Characteristics of PN Junction Diode – Zener Effect - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal Amplifier

#### (b)Digital Electronics

Binary Number System – Boolean algebra theorems, Digital circuits - Introduction to sequential Circuits,

Flip-Flops - Registers and Counters – A/D and D/A Conversion.

### COURSE OUTCOMES

- Apply the knowledge of basic laws to electric and magnetic circuits.
- Distinguish between various types of representation of ac quantities.
- Draw the phasor diagrams of an ideal and a practical transformer at no load.
- Analyse and design basic circuits which include diode, LED and seven segment display.
- Analyse and design circuits consisting of transistors.

### TEXT BOOKS:

1. V.N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, Second Edition, Tata McGraw Hill.
2. 2 Del Torro, Vincent “Electrical Engineering Fundamentals”, Second Edition Prentice Hall of India Pvt. Ltd.



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### **REFERENCE BOOKS:**

1. Fitzrald and Higgonbothom, “Basic Electrical Engineering”, Fifth Edition, McGraw Hill.
2. D.P. Kothari and I.J. Nagrath, “Theory and Problems of Basic Electrical Engineering”, PHI.
3. I.J. Nagrath and D.P. Kothari, ”Electrical Machines”, Tata McGraw Hill.
4. Ashfaq Hussain, “Fundamentals of Electrical Engineering”, Third Edition, Dhanpat Rai and Co.
5. H. Cotton, ”Advance Electrical Technology,” ISSAC Pitman, London. 6. Parker Smith S. (Ed. Parker Smith N.N.), “Problems in Electrical Engineering”, Tenth edition, Asia publication



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech.**

**Subject: Object Oriented Programming**

**Total Theory Periods: 48**

**Total Credits: 03**

**Branch: All Streams of Engineering**

**Code: BT 203**

**Total Tutorial Periods: 00**

### **COURSE OBJECTIVES**

- To learn the object-oriented programming concepts using C++.
- To design and implement C++ programs with the concept of OOP.
- To understand implementation issues related to object-oriented techniques.
- To learn how to build good quality software using object-oriented programming technique.

### **UNIT-I**

#### **INTRODUCTION TO OOP AND C++**

Concept of Object Oriented Programming, Procedural programming Vs. Object oriented programming (OOP), Features and Benefits of OOPs, Object Oriented Languages, Introduction to C++, C++ Compiler, C++ Standard library, Basics of a typical C++ environment and C++ program, Pre-processors directives, and illustrative simple C++ programs. Header files and namespaces, library files, Data Types, Keywords, Operators and Expressions, Control Structure, Loops, Arrays, Structures, Functions.

### **UNIT-II**

#### **CLASSES & OBJECT, CONSTRUCTORS&DESTRUCTORS**

Introduction to class, class object creation, Access of class members, Scope of class and its member, Nested class, Data hiding & encapsulation, Friend function, Array within a class, Array of object as function argument, Function returning object, Static member. Constructor function, Parameterized multiple constructor, Default constructor, Dynamic memory allocation with new and delete, Copy constructor, Constant and class, Data conversion between objects of different classes, Destructor function.

### **UNIT- III**

#### **INHERITANCE, POINTER, VIRTUAL FUNCTIONS & POLYMORPHISM**

Fundamentals of operator overloading, restrictions on operators overloading, operator functions as class members vs. as Friend functions, Overloading, <<, >> Overloading unary operators, overloading binary operators. Introduction to inheritance, Base classes and derived classes, protected members, Casting base class pointers to derived class pointers, Using member functions, Overriding base class members in a derived class, public, protected and private inheritance, Using constructors and destructors in derived classes, Implicit derived class object to base class object conversion, Composition Vs. Inheritance. Introduction to virtual functions, Abstract base classes and concrete classes, new classes and dynamic binding, virtual destructors, polymorphism, dynamic binding.



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### UNIT-IV

#### FILE I/O, TEMPLATES& EXCEPTION HANDLING

Files and streams, Creating a sequential access file, Reading data from a sequential access file, Updating sequential access files, Random access files, creating a random access file, Writing data randomly to a random access file, reading data sequentially from a random access file. Stream Input/output classes and objects, Stream output, Stream input, Unformatted I/O (with read and write), Stream manipulators. Function templates, Overloading template functions, Class template, Class templates and non-type parameters, Templates and inheritance, Templates and friends, Templates and static members. Basics of C++ Exception handling: Try Throw, Catch, Throwing an exception, catching an exception, rethrowing an exception, Exception specifications, processing unexpected exceptions.

### UNIT-V

#### OOPS CONCEPTS WITH PYTHON

Python Basics, Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types. Creating classes and objects, inheritance in python.

#### COURSE OUTCOME:

After completion of the course study, students will be able to

1. Explain the basics of Object Oriented Programming concepts.
2. Design and develop a C++ program with concept of Object Oriented Programming.
3. Apply the object initialization and destroy concept using constructors and destructors.
4. Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
5. Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
6. Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
7. Use I/O operations and file streams in programs.
8. Make an application/project using C++.

#### TEXT BOOKS:

1. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Python 3 Object-Oriented Programming - Third Edition

#### REFERENCE BOOKS:

1. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
2. Let Us C++, Yashavant Kanetkar, BPB Publication.
3. Programming with C++, John R. Hubbard, Schaum's Outlines, McGraw Hill Education.
4. Programming with C++, D. Ravichandran, McGraw Hill Education.
5. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.



# **MATS UNIVERSITY**

## **ARANG, RAIPUR (C.G.)**



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Branch: All Streams of Engineering**

**Subject: Constitution of India, Professional Ethics and Human Rights**

**Code: BT 204**

**Total Theory Periods: 15**

**Total Tutorial Periods: 00**

**Total Credits: 01**

### **COURSE OBJECTIVES**

- To assimilate and get familiarized with basic information about Indian constitution and provide overall legal literacy to the young technocrats to manage complex societal issues in the present scenario.
- To identify their individual roles and ethical responsibilities towards society.
- To understand engineering ethics & responsibilities, through the learning of these topics students will be able to understand human rights/ values and its implications in their life.

### **UNIT-I: CONSTITUTION OF INDIA**

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution, Preamble to the Indian Constitution Fundamental Rights & its limitations.

### **UNIT-II: FUNDAMENTAL DUTIES AND UNION EXECUTIVES**

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India

### **UNIT-III: STATE LEGISLATURE AND ELECTORAL PROCESS**

State Executives – Governor Chief Minister, State Legislature High Court of State, Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.

### **UNIT-IV: HUMAN RIGHTS**

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India ,Powers and functions of Municipalities, Panchyats and Co - Operative Societies..

### **UNIT-V: PROFESIONAL ETHICS**

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



### COURSE OUTCOMES

At the end of the course students will be able to...

- Understand the meaning and importance of Constitution
- Explain about making of Indian Constitution - contribution of Constituent assembly on it.
- Describe the Salient (Outstanding) features of Indian Constitution.
- Describe the importance of Preamble of the Indian Constitution and its significance.

### TEXTBOOKS:

1. Durga Das Basu: "Introduction to the Constitution on India", (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins "Engineering Ethics" Thompson Asia, 2003-08-05.

### REFERENCE BOOKS:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma, "Introduction to the Constitution of India", PHI Learning Pvt. Ltd., New Delhi, 2011.





# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Branch: Aero., Aero (Hons) Civil, Mining and Mechanical Engg.**

**Subject: Fundamentals of Mechanical Engineering**

**Code: BT 2051**

**Total Theory Periods: 48**

**Total Tutorial Periods: 00**

**Total Credits: 03**

### **OBJECTIVES:**

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

### **UNIT – I:**

#### **RESULTANT AND EQUILIBRIUM ANALYSIS:**

Basic concepts and laws of mechanics, system of forces, free body diagram, Resultant and equilibrium of concurrent, parallel and non-concurrent co-planar force system. General numerical applications.

### **UNIT – II :**

**(a) ANALYSIS OF PLANE TRUSSES** Perfect truss, basic assumptions for perfect truss, analysis of axial forces in the members by method of joint and method of sections. General numerical applications.

**(b) FRICTION** Static, dynamic and limiting friction, Law of limiting friction, Angle of friction,

Angle of Repose, Cone of Friction, Wedge friction. General numerical applications

### **UNIT –III :**

**PROPERTIES OF SURFACES** Centre of Gravity, Second moment of area, determination of second moment of area by integration, polar moment of inertia, radius of gyration of area, Parallel axis theorem, Moment of inertia of composite areas, and determination of Product of inertia by integration.

### **UNIT –IV :**

#### **KINETICS OF PARTICLES**

- (a) D'Alembert's principle applied to bodies having rectilinear motion.
- (b) Principle of work and Energy: General numerical applications
- (c) Principle of Impulse and momentum: General numerical applications



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### UNIT – V :

#### LAWS OF THERMODYNAMICS

- (a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work, general numerical application.
- (b) First Law of thermodynamics, internal energy, proof of internal energy as a point function, general numerical application of first law to non-flow process and steady flow process.

#### OUTCOMES:

- (a) Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- (b) Ability to analyse the forces in any structures.
- (c) Ability to solve rigid body subjected to dynamic forces.

#### TEXT BOOKS:

1. Engineering Mechanics (Statics and Dynamics) ; A. K. Tayal ,Umesh Pub., Delhi .
2. Engineering Mechanics : S. Timoshenko and D.H. Young, TMH
3. Engineering Thermodynamics: P.K.Nag, TMH
4. Engineering Thermodynamics: C.P.Arora, TMH

#### REFERENCE BOOKS:

1. Engineering Mechanics (Statics and Dynamics): R.C.Hibbeler, Pearson
2. Engineering Mechanics: Meriam and Kreige ,John Wiley and sons
3. Thermodynamics: Cengel and Boles, TMH
4. Essentials of Engg Mechanics: S.Rajasekharan&G.ShankaraSubramaniam, Vikas Publications
5. Engineering Mechanics: BasudebBhatyacharya , Oxford



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Subject: Introduction to Scripting**

**Total Theory Periods: 48**

**Total Credits: 03**

**Branch: Comp. Sci. and Engg. and CSE(Hons)**

**Code: BT 2052**

**Total Tutorial Periods: 00**

### **COURSE OBJECTIVE:**

1. Design and develop static and dynamic web pages.
2. Familiarize with Client-Side Programming,
3. Learn web page validations.
4. To design and implement web page scripts.
5. To learn how to build good interactive web pages using HTML and Javascript.

### **UNIT I – INTRODUCTION TO SCRIPTING LANGUAGES**

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

### **UNIT II - HTML BASICS**

HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images. Cascading style sheets: Adding CSS, CSS and page layout. JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects.

### **UNIT III - JAVASCRIPT PROGRAMMING OF REACTIVE WEB PAGES ELEMENTS**

Events, Event handlers, multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms. Introduction to Python Programming: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation, Types - Integers, Strings, Booleans.

### **UNIT IV - OPERATORS AND EXPRESSIONS**

Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations. Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences.

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### UNIT V - CONTROL FLOW

if, if-else, for, while, break, continue, pass Functions - Defining Functions, Calling Functions, Passing Arguments, Default Arguments, Variable-length arguments, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Development of sample scripts and web applications. Client Side Scripting, Server-Side Scripting, Managing data with SQL, Cookies, use the cookies, advantages of the cookies and how to create cookies. Introduction to Node.js.

### COURSE OUTCOME:

After completion of the course study, students will be able to

1. Explain the basics of websites and WebPages concepts.
2. Design and develop a Web Page with DOM Elements.
3. Apply the validation and verification of data at client end.

### TEXT BOOKS:

1. Beginning PERL, Curtis Poe, Wrox Publication
2. Sams Teach Yourself HTML, CSS and Java Script, Julie C, Meloni.
3. Javascript by Example, Ellie Quigley, Prentice Hall.
4. Programming Python, Mark Lutz, O'Reilly.

### REFERENCE BOOKS:

1. Learning Perl: Making Easy Things Easy and Hard Things Possible 7th Edition, O'Reilly
2. Mastering HTML, CSS & Javascript Web Publishing, Laura Lemay, Rafey Colburn, BPB Publications.
3. Eloquent Javascript, MarjinHaverbeke
4. Programming Javascript Applications, Eric Elliott, O'Reilly Media.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Subject: Engineering Chemistry Laboratory**

**Total Theory Periods: 28**

**Total Credits: 01**

**Branch: All Streams of Engineering**

**Code: BT 206**

**Total Tutorial Periods: 00**

### **COURSE OBJECTIVE:**

1. To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

### **LIST OF EXPERIMENTS**

1. Acid-base titration (estimation of commercial caustic soda)
2. Redox titration (estimation of iron using permanganometry)
3. Complexometric titration (estimation of hardness of water using EDTA titration).
4. Preparation and analysis of metal complex (for example thiourea/copper sulfate or nickel chloride/ammonia complexes).
5. Chemical kinetics (determination of relative rates of reaction of iodide with  $H_2O_2$  at room temperature (Clock reaction)).
6. Viscosity of solutions (determination of percentage composition of sugar solution from viscosity).
7. Detection of functional groups in organic compounds.
8. Utilization of paper/thin layer/column chromatographic techniques in the separation of organic compounds
9. Conduct metric titration (determination of the strength of a given HCl solution by titration against a standard NaOH solution).
10. Determine the amount of oxalic Acid and sulphuric Acid/Hydrochloric Acid in one liter of solution given standard Sodium Hydroxide and Potassium Permanganate.
11. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.
12. Determination of dissolved Oxygen in given sample of water.
13. Determination of calorific value of fuel by Bomb Calorimeter.
14. Determination of Flash Point and Fire Point of Lubricant by Abels and Pensky Martin apparatus.

### **COURSE OUTCOME:**

1. The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.



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**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Branch: All Streams of Engineering**

**Subject: Basic Electrical & Electronics Engineering Laboratory**

**Code: BT 207**

**Total Theory Periods: 28**

**Total Tutorial Periods: 00**

**Total Credits: 01**

### **List of Experiments (To perform minimum 10 experiments)**

1. To verify Thevenin's theorem and Norton's theorem.
2. To verify Superposition theorem.
3. To verify Kirchhoff's Current Law and Kirchhoff's Voltage Law.
4. To verify Maximum Power Transfer theorem
5. To determine V– I characteristics of Incandescent lamp.
6. To study B-H curve.
7. To measure current, power, voltage and power factor of series RLC circuit.
8. To measure current, power, voltage of parallel RLC circuit.
9. To measure current, power, voltage of series parallel RLC circuit.
10. To measure R and L of choke coil.
11. To study construction of transformer.
12. To perform ratio test and polarity test of single phase transformer.
13. To calculate efficiency of single phase transformer by direct loading.
14. To study construction of D.C. machine.
15. To study charging and discharging of a capacitor.
16. To study the Wattmeter and Energy meter.



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ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Subject: Advance Programming Laboratory**

**Total Theory Periods: 28**

**Total Credits: 01**

**Branch: All Streams of Engineering**

**Code: BT 208**

**Total Tutorial Periods: 00**

- 1 Write a program to check whether a given number is Prime or not.
- 2 Write a program to read number and to display the largest value between two, three or four numbers by using switch-Case statements.
- 3 Write a program to find sum of first natural numbers :  $\text{sum} = 1+2+3+4+\dots+100$  by using
  - a. for loop
  - b. while loop
  - c. do-while loop
- 4 Write a program to find sum of the following series using function:  
 $\text{Sum} = x - (x)^3/3! + (x)^5/5! - \dots + (x)^n/n!$
- 5 Write a program to read the elements of two matrices & to perform the matrix multiplication.
- 6 Write a program to swap the contents of two variable by using
  - a. call by value
  - b. Call by reference
- 7 Write a program to perform the following arithmetic operations on complex numbers using structure
  - a. Addition of the two complex numbers
  - b. Subtraction of two complex numbers
  - c. Multiplication of two complex numbers
  - d. Division of two complex numbers
- 8 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
- 9 Write an object-oriented program (OOP) using C++ to exchange the private data members of two different functions using friend functions.
- 10 Write an OOP using C++ to count how many times a particular member function of a class is called by:
  - a. A particular object
  - b. Any objects
- 11 Write an OOP using C++ to define a constructor for a "Date" class that initializes the Date objects with initial values. In case initial values are not provided, it should initialize the objects with default values.

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- 12 Write an OOP using C++ to overload:  
a. + Operator                      b. = operator                      c. >> operator                      d. ++ operator
- 13 Write a C++ program to demonstrate how ambiguity is avoided using scope resolution operator in the following:  
a. Single Inheritance                      b. Multiple Inheritance
- 14 Write a C++ Program to demonstrate function overloading for swapping of two variables of the various data types (integer, floating-point number and character type).
- 15 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
- 16 Write a C++ program to access the private data of a class by non-member function through friend function where the friend function is declared:  
a. in the location of public category                      b. in the location of private category  
c. within the scope of a class definition itself                      d. defined with inline code subtraction
- 17 Write a C++ program to demonstrate how a pure virtual function is defined, declared and invoked from the object of derived class through the pointer of the base class.
- 18 Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file.
- 19 Write a program to copy the contents of one text file to another and display both the files using a text Menu.
- 20 Create a database of 10 students. The database should contain the name, marks of 5 subjects, aggregate marks, aggregate percentage and division according to the following conditions:  
a. Percentage greater or equal to 60 – First division  
b. Percentage between 50 and less than 60 – Second division  
c. Percentage between 40 and less than 50 – Third division  
d. Percentage below 40 – Improvement required  
Display the above database of every student in a tabulated form. Implement the above program using Structures, Text-Menu and File I/O operations.
- 21 Write an OOP using a class template to read any five parameterized data type such as float and integer, and print the average.
- 22 Write a program for sorting of numbers with Bubble Sort using template function.
- 23 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
- 24 Write a C++ program to read two numbers and find the division of these two numbers using exception handling.



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- 25 Write a C++ program to create a function which take a parameter, if the value of parameter is  $> 0$  then throw integer type, if parameter is  $= 0$ , then throw character type, if parameter is  $< 0$  then throws float type exception but for all design use only one catch block.
- 26 Write a python program for finding biggest number among 3 numbers.
- 27 Implement Python Script to generate prime numbers series up to n
- 28 Implement python script to read person's age from keyboard and display whether he is eligible for voting or not.
- 29 Write a python program to work with classes and objects.
- 30 Write a python program that makes use of function to display all such numbers, which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.

### LIST OF EQUIPMENT/ MACHINE REQUIRED

PCs, Turbo C++ compiler, Online C++ Compiler, Python 3/Python IDE, Online python compiler

### REFERENCES:

1. Programming with C++, D. Ravichandran, McGraw Hill Education.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Mastering C++, K. R. Venugopal, McGraw Hill Education.
4. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
5. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
6. Let Us C++, Yashavant Kanetkar, BPB Publication.
7. Head-First Python: A Brain-Friendly Guide (2nd Edition), Paul Barry, Oreilly.
8. Python Programming: An Introduction to Computer Science (3rd Edition), John Zelle,



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## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Branch: Aero., Aero. (Hons.) Civil, Mining and Mechanical Engg.**

**Lab: Fundamentals of Mechanical Engineering Laboratory**

**Code: BT 2091**

**Total Practical Periods: 28**

**Total Credits: 01**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

### LIST OF EXPERIMENTS

1. To verify law of triangle of forces.
2. To verify the Lami's theorem.
3. To verify the law of polygon of forces.
4. To verify the law of lever. 5. To determine the support reactions of a simply supported beam subjected to point loads.
6. To draw the variation of bending moment at a given section in a simply supported beam under a moving point load.
7. To find the coefficient of friction between surfaces of wooden plane and following blocks: i) Aluminum ii) Tin iii) Glass iv) Asbestos v) Teak ply vi) Sand paper vii) card board .
8. To determine the coefficient of friction between (i) Belt and pulley (ii) Rope and pulley.
9. To study simple jib crane and to determine the internal forces in members of jib crane.
10. To determine the stiffness of helical compression spring.
11. To study lifting machine.
12. To study the lifting machine "second order pulley system" and to draw the following characteristic diagram: ( i ) Load-effort diagram ( ii ) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.
- 13 To study the lifting machine "Wheel and Differential axle" and to draw the following characteristic diagram: (i). Load-effort diagram (ii) Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.
14. To study the lifting machine "Worm and worm wheel" and to draw the following characteristic diagram: (i). Load-effort diagram (ii). Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.



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15. To study the lifting machine “Simple screw jack” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii). Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

16. To study the lifting machine “Modified screw jack” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

17. To study the lifting machine “Geared Jib crane” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

18. To study the lifting machine “Single Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram

(iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

19. To study the lifting machine “Double Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



**MATS UNIVERSITY, RAIPUR (C.G.)**

**SCHOOL OF ENGINEERING & I.T.**

**Semester: II B. Tech**

**Lab: Java Script Laboratory**

**Total Practical Periods: 28**

**Branch: Comp. Sci. and Engg. and CSE(Hons)**

**Code: BT 2092**

**Total Credits: 01**

**Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED**

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo also write three HTML documents for the links.
2. Design HTML page describing your academic career. The page will tell about the degrees, Institutions and your hobbies. Add some lists too.
3. Design HTML page demonstrating concept of Internal Hyper-link
4. Design HTML page which gives the list of grocery Items by using Ordered List , List consist of Roman no, A,B.... and so on.
5. Design HTML page which gives the list of grocery Items by using Unordered List bullets are of form disc, square and circle.
6. Design a HTML page for partitioning browser window in frames display the different pages in partitioned windows.
7. Design HTML page to partition window, Design in such a way that link clicked in on page can display the corresponding pages in other window.
8. Write a Java script to prompt for users name and display it on the screen.
9. Write a java script program to test the first character of a string is uppercase or not.
10. Write a java script program for pattern that matches e-mail addresses.
11. Write a java script program to check whether a given number is Prime or not.
12. Write a java script function to print an integer with commas as thousands separators.
13. Write a java script program to sort a list of elements using any sorting algorithm.
14. Write a java script for loop that will iterate from 0 to 15. For each iteration, it will check if the current number is odd or even, and display a message to the screen.
15. Write a java script program which compute, the average marks of the following students then this average is used to determine the corresponding grade.
16. Write a java script program to sum the multiple s of 3 and 5 under 1000.
17. To design the scientific calculator and make event for each button using java script.
18. Write a java script program to find sum of first natural numbers :  $\text{sum} = 1+2+3+4+\dots+100$  by using
  - a. for loop
  - b. while loop
  - c. do-while loop
19. Write a java script program to find sum of the following series using function:  
 $\text{Sum} = x - (x)^3/3! + (x)^5/5! - \dots + (-1)^n (x)^n/n!$



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



- 20 Design HTML form for keeping student record and validate it using Java script.
- 21 Write programs using Java script for Web Page to display browsers information.

### List of Equipment/ Machine Required

PCs, Java script supported Browser, Node.js

### References:

1. Mastering HTML, CSS & JavaScript Web Publishing, Laura Lemay, Rafey Colburn, BPB Publications.
2. Head First JavaScript programming, Eric Pressman & Elizabeth Robson, O'Reilly.



# MATS UNIVERSITY

## ARANG, RAIPUR (C.G.)



MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

**Semester: II B. Tech**

**Branch: All Streams of Engineering**

**Manufacturing Practices– II Laboratory**

**Code: BT 210**

**Total Practical Periods: 45 + (15 Instructional Periods)**

**Total Credits: 02**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

### Course Objective:

1. To make the student acquire practical skills in the machining, fitting and forging operations.

### Instructional Syllabus

#### **Machining:**

Introduction to machining and common machining operations. Cutting tool materials. Definition of machine tools, specification and block diagram of lathe, shaper, drilling machine and grinder. Common lathe operations such as turning parting, chamfering and facing. Quick return mechanism of shaper. Difference between drilling and boring. Files-material and classification.

#### **Fitting:**

Need of fitting, different types of instruments used in fitting shop.

#### **Forging:**

Forging principle, materials, operations like drawing, upsetting, bending and forge welding, use of forged parts.

#### **List of Experiments**

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. (a) Drilling two holes of size 5 and 12 mm diameter on job used/to be used for shaping.  
(b) Grinding a corner of above job on bench grinder
4. Finishing of two sides of a square piece of filling
5. Tin smithy for making mechanical joint and soldering of joints
6. Perform step cutting on mild steel plate.

### Course Outcome:

1. The students will be conversant with hands-on knowledge in the machining, fitting and forging operations.