Chhattisgarh Swami Vivekanand Technical University (CSVTU), Bhilai (CG)

SCHEME OF TEACHING AND EXAMINATION

Courses of Study and Scheme of Examination of P1 Group
B Tech (First Semester - Common to all Branches of Engineering) 2019-20

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
							Theory/Lab				
				L	T	P	ESE	CT	TA		
1.	Basic Sciences	Physics-I	A000111(015)	3	1	-	100	20	30	150	4
2.	Basic Sciences	Mathematics-I*	A000112(014)	3	1	-	100	20	30	150	4
3.	Electrical Engineering	Basic Electrical and Electronics Engg.	A000113(024)	2	1	-	100	20	30	150	3
4.	Mechanical Engineering	Engineering Graphics and Design	A000114(037)	1	0	-	100	20	30	150	1
5.	Computer Science	Fundamentals of Computer	A000115(022)	2	0	-	100	20	30	150	2
6.	Basic Sciences	Physics (Lab)	A000121(015)	-	-	2	40	-	20	60	1
7.	Electrical Engineering	Basic Electrical and Electronics Engg. (Lab)	A000122(024)	-	-	2	40	-	20	60	1
8.	Computer Science	Fundamentals of Computer (Lab)	A000123(022)	-	-	2	40	-	20	60	1
9.	Mechanical Engineering	Engineering Graphics and Design (Lab)	A000124(037)	-	-	4	40	-	20	60	2
10.	Humanities	Value Education	A000105(046)	-	-	-	-	-	10	10	-
			Total Marks	**11**	**3**	**10**	**660**	**100**	**240**	**1000**	**19**

L-Lecture, T-Tutorial, P-Practical, ESE-End Semester Exam, CT- Class Test, TA-Teacher's Assessment

Note :

(a) The teaching in the 1st and 2nd Semester will be divided in two groups consisting of various branches as shown below :

P1-GROUP : Electronics & Telecommunication, Mechanical, Civil, Mining, Applied Electronics & Instrumentation, Metallurgy, Mechatronics, Automobile, Production Engineering, Fashion and Apparel Engineering

Q1-GROUP : Computer Science, Information Technology, Electronics & Instrumentation, Electrical, Chemical, Electrical & Electronics, Plastic Engineering, Agriculture Engineering, Biotechnology

(b) *Mathematics-I will be taught to both the groups in the first semester.

(c) Value Education will be conducted by the relevant discipline/humanities as decided by the Principal.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech - Ist   **Branch: Common to all Branches**
Subject: Physics-I   **Course Code: A000111(015)**
Total Marks in End Semester Exam: 100   **L:3 T:1 P:0   Credits: 4**
Minimum number of Class Tests: 02

Course Objective:
Basic concepts of Mechanics, Optics and its applications, Electromagnetism, Quantum & Semiconductor Physics.

Note:
5 Units / Semester - Total 50 hrs. (L + T)
Branch wise:
- Civil/Metallurgy/Mining   - Units 1/2/3/8/10
- Mechanical/Mechatronics/Production/Automobile - Units 1/4/5/6/10
- Electrical/Electrical & Electronics/Chemical   - Units 1/3/7/8/9
- Computer Science/IT/Electronics/EI/AEI/Biotech - Units 1/7/8/9/10

Unit-1: Physical Quantities, Motion in Two or Three dimensions   **(10hrs.)**

Standards and Units, Unit consistency and conversions, Uncertainty and Significant figures, Estimates and orders of magnitude, Position and velocity vectors, The Acceleration vector, Projectile motion, Motion in a circle, Relative velocity, Free body diagrams, Conservative and Non-conservative Forces; Central forces, Noninertial frames of reference.

Unit-2: Mechanics of Solids   **(10hrs.)**

Angular velocity and acceleration, Rotation with constant angular acceleration, Relating linear and angular kinematics, Energy in rotational motion, Parallel axis theorem, Moment of Inertia calculations, Conditions for equilibrium, Bending Stress, Shear stress, Concept of strain energy, Elastic Module, Concepts of elasticity and plasticity.

Unit-3: Wave Optics   **(10hrs.)**

Superposition of waves and interference of light by wave front splitting and amplitude splitting, Fresnel bi-prism; wedge shaped film, Newton's rings, Farunhofer diffraction from a single slit, The Rayleigh criterion for limit of resolution and its application to vision, Diffraction gratings and their resolving power.

Unit-4: Electrostatics in vacuum and dielectric medium   **(10hrs.)**

Calculation of electric field and electrostatic potential for a charge distribution,Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential,Laws of electrostatics, Polarisation, Permeability and dielectric constant, Polar and non-polar dielectrics, Solving simple electrostatics problem in presence of dielectrics like Point charge at the centre of a dielectric sphere.

Unit-5: Magneto static in a linear magnetic medium   **(10hrs.)**

Bio-Savart law, Divergence and curl of static magnetic field,vector potential and calculating it for a given magnetic field using Stokes' theorem, Magnetisation, Solving for magnetic field due to simple magnets like a bar magnet, Permeability and Susceptibility, Classification of magnetic materials, Ferromagnetism, Paramagnetic and diamagnetic materials, Magnetic domains and hysteresis.

Unit-6: Faraday's law and Electromagnetic waves (10hrs.)

Faraday's law of electromagnetic induction, Continuity equation for current densities, displace current and magnetic field arising from time dependent electric field, Maxwell's equation in vacuum, Energy in an electromagnetic field, Flow of energy and Pointing vector, Plane electromagnetic waves in vacuum, Their transverse nature and polarization, Relation between electric and magnetic fields of an electromagnetic wave.

Unit-7: Introduction to Quantum Mechanics (10hrs.)

Wave nature of Particles, Time-dependent and time-independent Schrodinger equation for wave function, Born interpretation, Expectation values (only basic), Free-particle wave function and wave-packets, Uncertainty principle, Solution of stationary-state Schrodinger equation for one dimensional problem like particle in a box.

Unit -8: Solid electronic materials (10hrs.)

Electron in periodic potential, Kronig-Penny model (only basic to introduce origin of band gap), E-k diagram, Electron conduction, Conductivity, Drift velocity, Energy bands in solids, Direct and indirect band gaps, Types of electronic materials: metals, semiconductors, and insulators, Occupation probability, Fermi level, Effective mass, Density of states and energy band diagrams.

Unit -9: Semiconductors (10hrs.)

Intrinsic and extrinsic semiconductors, Electron and hole concentration, Concept of Fermi Level, Dependence of Fermi level on carrier-concentration and temperature, Doping, impurity states, n and p type semiconductors, Carrier generation and recombination, Law of mass action, Charge neutrality condition ,Carrier transport: diffusion and drift, p-n junction, Depletion region and potential barrier, Energy band structure of PN junction in forward and reverse biasing ,Metal semiconductor junction (Ohmic and Schottky).

Unit-10: Lasers & Fibre Optics (10hrs.)

Einstein's theory of matter radiation interaction and A and B coefficients, amplification of light by population inversion in optical resonator, different types of lasers: gas lasers (He-Ne,), solid-state lasers (ruby, Neodymium), semiconductor laser, Properties of laser beams.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Numerical aperture and various fibre parameters, Losses associated with optical fibres, Step and graded index fibres, Application of optical fibres.

Course Outcomes:

Students will be familiar with:
- Mechanics of solids, Wave optics & its engineering applications.
- Some of the basic laws related to electromagnetic.
- Introduced to the principle of Semiconductor physics.
- Simple quantum mechanics calculations.

Text Books:
1. Introduction to Mechanics-Mahendra K. Verma,Universities Press, Hyderabad
2. David Griffiths, Introduction to Electrodynamics, Addison-Wesley Professional
3. H. J. Pain, The Physics of Oscillations and Waves, Wiley
4. J. Singh, Semiconductor Optoelectronics: Physics and Technology McGraw-Hill Inc
5. Quantum Mechanics, Ajay Ghatak S. Lokanathan, Trinity
6. Engineering Physics by Gaur & Gupta,DhanpatRai Publications

Reference Books:

1. Engineering Physics by PG Kshirsagar& M N Avadhanulu, S. Chand Publications
2. Modern Physics for Engineers, S.P. Taneja, R. Chand
3. Engineering Physics, Malik and Singh, Tata McGraw Hill
4. Sears and Zemansky's University Physics, Volume-1 Mechanics, Pearson
5. Mechanics, Mathur, S.Chand Publishing
6. Electromagnetic Theory, Prabir K. Basu&HrishikeshDhasmana, AneBooks
7. David Griffiths, Quantum Mechanics, Pearson Education
8. Quantum Mechanics: A Text Book for undergraduates, Mahesh C Jain, TMH
9. A. Ghatak , Optics, McGraw Hill Education
10. O. Svelto, Principles of Lasers, Springer Science & Business Media
11. The Physics of waves and Oscillations, N.K. Bajaj, TMH
12. H. C. Verma, Concepts of Physics Vol – 1&2, Bharti Bhawan Publication
13. Halliday and Resnick, Physics.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech - Ist

Branch: Common to all Branches

Subject: Mathematics - I

Course Code: A000112(014)

Total Marks in End Semester Exam: 100

L: 3 T: 1 P: 0   Credits: 4

Minimum number of Class Tests: 02

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis 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. More precisely, the objectives are:

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.
- To develop the essential tool of matrices and linear algebra in a comprehensive manner.

UNIT I: Calculus (8 hours)

Evaluation of definite and improper integrals, reduction formulae, Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT II : Calculus (8 hours)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

UNIT III : Sequences and series: (8 hours)

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

UNIT IV : Multivariable Calculus (Differentiation) (8 hours)

Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence directional derivatives.

UNIT V : Matrices (8 hours)

Rank of a matrix by elementary transformation, normal form of a matrix, System of linear equations; Symmetric, skewsymmetric and orthogonal matrices; Eigen values and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem and Orthogonal transformation.

Text/Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
8. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra,Affiliated East–West press, Reprint 2005.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in basic 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.

The students will learn:

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions.
- The essential tools of matrices and linear algebra including linear transformations, eigen values, diagonalization and orthogonalization.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.Tech - Ist   **Branch: Common to All Branches**

Subject: Basic Electrical and Electronics Engineering   **Course Code: A000113(024)**

Total Marks in End Semester Exam: 100   **L: 2 T:1 P:0   Credits: 3**

Minimum number of class tests to be conducted: 02

Course Objective:
- 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:

Introduction, Ohm's law, Kirchhoff's laws, Mesh and Nodal analysis, Superposition theorem, (only independent sources)**.** Definitions of MMF, Magnetic field strength, Reluctance, Leakage flux and fringing, Core losses, Comparison of the Electric and Magnetic Circuits, Problems on Series Magnetic Circuits.

Unit – II: A.C. Circuits:

Production of AC voltage, Basic Definitions of root mean square and average values, form factor and peak factor, the j operator and Phasor Algebra, Analysis of ac series and Parallel Circuits, Series- Parallel Circuits.

Unit – III: Single phase Transformers:

Introduction, Principles of operation, Constructional details, Ideal Transformer and Practical Transformer, EMF equation, Rating, Phasor diagram at no load, Losses in Transformers.

Unit-IV: Diode:

Brief Review of Semiconductors, N-Type & P-Type Semiconductors, Formation of Depletion Layer in a PN Junction, Forward & Reverse Biased, V-I Characteristic, Diode Current Equation,Diode Applications.LED, Advantages & applications of LEDs., Seven-segment Displays,

Unit-V: Transistor:

BJT Construction, Junction Biasing of BJT, Operation of NPN & PNP BJT, Input and Output Characteristics of Transistor in CE configuration; Transistor as an Amplifier& as a Switch. Advantages of ICs & Scale of Integration.

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. Fundamentals of Electrical Engineering & Electronics, B.L. Theraja,S. Chand Publication.
2. Principles of Electronics by V. K. Mehta, 3rd Edition, S. Chand and Co.Ltd.**(Unit-IV & V)**
3. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI.

Reference Books:

1. Fitzrald and Higgonbothom, "Basic Electrical Engineering", Fifth Edition, McGraw Hill.
2. V.N. Mittal and Arvind Mittal, "Basic Electrical Engineering", Second Edition, Tata McGraw Hill.
3. Electrical and Electronic Technology By Hughes 10th Edition , Pearson Education.
4. A textbook of Electronic Circuits. By R. S. Sedha, S. Chand Publication.
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.
7. Del Torro, Vincent "Electrical Engineering Fundamentals", Second Edition Prentice Hall of India Pvt. Ltd.
8. Basic Electrical & Electronics Engineering 1stEdition   by **D. P. Kothari** and **I. J. Nagrath,**
9. Electronics Devices and Circuits by Jacob Millman and Christos C. Halkias, 3rd Edition Mc. Grah Hill Pub.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.Tech - Ist

Branch: Common to All Branches

Subject: Engineering Graphics and Design

Course Code: A000114(037)

Total Marks in End Semester Exam: 100

L: 1 T: 0 P: 0   Credits: 1

Minimum number of class tests to be conducted: 02

Course Objective:
1. To introduce the students to the "universal language of Engineers" for effective communication through drafting exercises of geometrical solids.
2. Understanding of technical drawings
3. Learn basic CAD software skills.
4. Learn basic engineering drawing formats.
5. Make basic engineering drawings using graphics software.
6. Develop the graphical skills for communication of concepts, ideas and design of engineering

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Unit I: Introduction to Engineering Drawing

Principles of Engineering drawing and their significance, Lines, Lettering, Dimensioning, Scales,

Unit II: Projection

Principles of projection, Method of projection, First and third angle projections, Orthographic projections, Isometric projection.

Unit III: Basic concept of drafting software

Introduction to CAD software, merits and demerits of CAD, Application of CAD, GUI, limits and units, Basic co-ordinate system, setting of status bar option-snap, grid, O-snap, Dynamic input, ortho, polar, and etc. concept of block, viewports and layer.

Unit IV: Drafting using CAD software

Drawing Tools: Circle, Arcs, Rectangle, Polygon, Ellipse, Spline, Poly-Line, and Multi-Line. Editing Tools: Trim, Move, Copy, Rotate. Geometry Modifying Tools: Fillet, Chamfer, Scale, Stretch. Copying Tools: Array, Mirror, and Offset. Dimensioning and Annotations.

Unit V: 3-D modeling using CAD software

Types of three dimensional model, basic primitives' tools: extrude, revolve, sweep, loft, wedge. Solid editing Tools: shell, round, taper faces, copy faces, chamfer edges, modifying tools: 3D-move, 3D- copy, rotate, scale, align. Copying tools: array and its type,

Text Books:

1. Bhatt, N.D., "Elementary Engineering Drawing", Charotar Book Stall, Anand
2. George Omura, " Mastering AutoCAD" B.P.B. Publication, New Delhi

Reference Books:

1. Engineering Graphics – Laxminarayanan & V. and Vaish Wanar, R.S. Jain Brothers, New Delhi
2. Engineering Graphics – Chandra, AM & Chandra Satish 1998.
3. Engineering Graphics – K.L. Narayan and P. Kannaih, Tata McGraw Hill
4. AutoCAD: A problem solving approach- Tickoo, S. Delmar Cengage Learning 2015.
5. Mastering AutoCAD and AutoCAD LT-George Omura, Brian C. Benton, Wiley publisher, 2018.

Course Outcomes:

After learning the course the students should be able to

- To know and understand the conventions and the method of engineering drawing.
- To improve their visualization skills through interpretation of Orthographic, Isometric views of objects so that they can apply this skill in developing new products.
- To improve their technical communication skill in the form of communicative drawings.
- To create 2-D Computer geometry and it's dimensioning.
- To create 3-D Computer geometry and able to visualize it for presentation graphics.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech - Ist
Subject: Fundamentals of Computer
Total Marks in End Semester Exam: 100
Minimum number of Class tests: 02

Branch: Common to All Branches
Course Code: A000115(022)
L: 2 T: 0 P: 0   Credits: 2

Course Objective:

1. To learn the Computer Fundamental concepts
2. To aware students about Software and Hardware
3. To make them to use basic components of MS Office
4. To give the foundations for different Applications

Unit I: Fundamentals of Computers

Generations of computer, block diagram of a computer, computer hardware and software components: Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Memory Hierarchy: Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks vs optical disks (CD, CD-RW and DVD Memory), data – numeric data, alpha numeric data, concept of data and information: storage, seeking, processing and transmission.

Unit II: Hardware and Software

Computer Peripherals: Cables, Buses, Device drivers, installation of devices: keyboard, mouse, scanner, printer, web-camera, speakers and many more; plug-and-play devices; expansion slots……..System software, Program Language Translators, application software, Programming Language Paradigms: Imperative, Object-Oriented and Logic languages, Basics of Popular Operating Systems (Windows and Linux); The User Interface, Using Mouse and Organizing Desktop components, Running an Application, File, Folders and Directory management features, Using Help; Creating Short cuts, Configuring Operating System: Windows and Ubuntu, BIOS, System Utilities and Antivirus software.

Unit III: Basic Computer Literacy

Word Processing Basics (MS Word / LibreOffice Writer): Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document; Using Spread Sheets (MS Excel / LibreOffice Calc) Basic operations of Spreadsheets; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet; Basics of presentation software (MS PowerPoint / LibreOffice Impress) Preparation and Presentation of Slides; Slide Show; How to make an effective presentation: Working with Presentation Tools (Create, Edit, Move, Delete, Resize, Format text object), Working with Graphics tools (Creating Tables, Organization Charts, Hyperlinks), Saving, editing and closing presentation; Taking printouts of presentation / handouts.

Unit IV: Computers and Communication

WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Networking Devices, Topologies, Cables and connectors, Connecting to internet; ISP; Basics of internet connectivity related troubleshooting, Web Browsing software, Search Engines; URL; Domain Names; IP

Addressing, Wi-Fi and Bluetooth technology overview, Internet and Intranet: architecture, various file formats, Applications of INTERNET: Electronic mailing systems (Google Mail features): Creating and Managing mailing accounts, folders, Document collaboration, Instant Messaging, Netiquettes; Skype calling and Messenger services;functioning and features of smart gadgets: Smart phones, 4K smart television gadgets, kindle, gaming-gadgets, fitness gadgets and alike.

Unit V: Application Domains

Impact of computers in society: Computer applications in office automation, book publishing, data analysis, accounting, investment, inventory control, graphics and multimedia, air and railway ticket reservation sites, robotics, cyber security, Audio andVideo-conferencing, social networking, surveillance, Case Studies: Computer Literacy for banking, KYC, Insurance and financial transactions, operating mobile banking, Nine Pillars of Mission Digital India (DI-Initiatives) and their scheme highlights.

Text Books:

1. Computer Basics by IGNOU.
2. Suresh K Basendrea: Computers Today
3. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.
4. Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi
5. Sanders Donald H Computers Today

Course Outcomes:
The student will learn
- To familiar with Computer Fundamental
- To know about MS Office.
- To use different text, spreadsheet and presentation skill.
- To apply different applications.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech - Ist   **Branch: Common to all branches**

Subject: Physics (Lab)   **Course Code: A000121(015)**

Total Marks in End Semester Exam: 40   **L: 0 T: 0 P: 2   Credits: 1**

Course Objective:

Physics lab provides students the first-hand experience of verifying various theoretical concepts learnt in theory courses.

Total 36 labs. Hrs. About 10 – 12 experiments to illustrate the concepts learnt in Physics (Hrs. 3/ week).
Suitable number of experiments from the following categories:

- Mechanics
- Optics and its applications
- Electromagnetic
- Semiconductor Physics
- Laser & Optical fiber

Text book:

1. A textbook of Engineering Physics Practical 2nd edition, University Science Press

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Laboratory Objective:

Students should be able to
- State various laws which they have studied through experiments.
- Describe principles of LASER & Optical fibre.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.Tech - Ist   **Branch: Common to All Branches**
Subject: Basic Electrical and Electronics Engineering (Lab)   **Code: A000122(024)**
Total Marks in End Semester Exam: 40   **L: 0 T: 0 P: 2   Credits: 1**

Lab Objective:
- Verify the basic laws and theorems of DC circuits.
- Analysis the RLC series, parallel and series, parallel ac circuits.
- Understand the construction and perform ratio test on a single phase transformer.
- To plot and find out the characteristics of a diode in forward and reverse bias.
- Top plot and find out the input and output characteristics of a transistor

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List of Experiments (To perform minimum 10 experiments):

1. To verify Superposition theorem.
2. To verify Kirchhoff's Current Law and Kirchhoff's Voltage Law.
3. To determine V– I characteristics of Incandescent lamp.
4. To study B-H curve.
5. To measure current, power, voltage and power factor of series RLC circuit.
6. To measure current, power, voltage of parallel RLC circuit.
7. To measure current, power, voltage of series parallel RLC circuit.
8. To measure R and L of choke coil.
9. To study construction of a single phase transformer.
10. To perform ratio test and polarity test of a single phase transformer.
11. To calculate efficiency of a single phase transformer by direct loading.
12. To verify Thevenin's theorem and Norton's theorem.
13. To study construction of Single Phase A.C. machines.
14. To study construction of Three Phases Induction motors.
15. To study charging and discharging of a capacitor.
16. To study types of meters in the lab.
17. To study construction of D.C. machine.
18. To plot V-I characteristics of PN Junction Diode.
19. To plot V-I characteristics of Light Emitting Diode.
20. To plot Static Characteristics of Transistor in CE configuration
21. To study the operation of transistor as a switch.
22. To study the operation of transistor as an amplifier.

Lab Outcomes:
Students will be able to
- Relate the Basic laws and theorems with the practical applications.
- Apply the knowledge in their daily life with electrical circuits.
- Visualize the magnetic and electric circuits in a transformer.
- Analyze diode circuits and to design and implement diode applications.
- Analysis and design circuits using bipolar transistors.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech - Ist   **Branch: Common to All Branches**
Subject: Fundamental of Computer (Lab)   **Course Code: A000123(022)**
Total Marks in End Semester Exam: 40   **L: 0 T: 0 P: 2 Credits: 1**

The laboratory should be preceded or followed by a Practical Lecture to explain the approach or algorithm to be implemented for the problem given. Open Source software can be used.

Practical Lecture (L T P) – 0 0 1	Lab. Work (L T P) – 0 0 3
Practical Lecture 1:Introduction and working of Hardware Components	**Lab1**: Identifying the computer hardware like input output devices, CPU, mother board, Buses etc.
Practical Lecture 2: Introduction and working of Software.	**Lab 2**: Making Algorithm, DFD, ER diagram. Working of software's like system, Utility, Application software.
Practical Lecture 3: Introduction and working of Operating System	**Lab 3**: Basic operations of Operating System: creating file, Directory, Removing file, directory, date time setting, renaming etc. use internal and external connabds.
Practical Lecture 4: Introduction and working of MS Office	**Lab 4**: use the basic features of MS Office
Practical Lecture 5: Introduction of MS Word	**Lab5: Create** the document with all alignment. Use the different properties of MS Word
Practical Lecture 6: Introduction of MS Excel	**Lab 6**: Make the use of Spreadsheet for data representations, Calculation and graphical presentations. Use properties of Excel
Practical Lecture 7: Introduction of Power presentation	Lab 7: MS-PowerPoint Make the presentation with Multimedia features. Use the animation tools

Practical Lecture 8 &9: Introduction of computer communication	**Lab 8 and 9**: *Computer communication related practical*
	
	1. Connect the Internet; open any website of your choice and save the WebPages.
	2. Search any topic related to your syllabi using any search engine and download the relevant material.
	3. Send any greeting card to your friend.
	4. Create your E-Mail ID on any free E-Mail Server.
	5. Login through your E-Mail ID and do the following:
	   a. Read your mail
	   b. Compose a new Mail
	   c. Send the Mail to one person
	   d. Send the same Mail to various persons
	   e. Forward the Mail
	   f. Delete the Mail

	g. Send file as attachment
	6. Surf Internet using Google to find information about your state
	7. Surf Internet using Google to find Tourism information about your state
	8. Surf Internet using Yahoo to find Hotels around your state
	9. Surf Internet using Google to find information about educational institutes for teaching M.S in comp science in India
	Surf Internet using Google to find information about Indian Compare the cost, overheads and
Practical Lecture 10: installing Computer System	**Lab 10:** Installing the working computer system
Practical Lecture 11: Different ICT use of Government Schemes	**Lab 11: Filling online AAADHAR, Voter id, PAN etc form**
Practical Lecture 12: Applications of Computer in Digital India	**Lab 12**: online filling of different digital India applications

Laboratory Outcomes:

- To give idea about fundamentals of Computer
- To make familiar with MS Office
- To be able to write, document, present their work when developing project
- To be able to better foundations in Computer Field.
- To be able to know online applications of Digital India.

Text & Reference books:

1. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.
2. Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi
3. Suresh K Basendrea: Computers Today
4. Sanders Donald H Computers Today

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.Tech - Ist **Branch: Common to All Branches**
Subject: Engineering Graphics and Design (Lab) **Course Code: A000124(037)**
Total Marks in End Semester Exam: 40 **L: 0 T: 0 P: 4   Credits: 2**

List of Practical:

1. Study of any drafting software- GUI, limits and units, drawing tools, editing tools, annotations, etc.
2. Study of co-ordinates systems- Cartesian and polar (absolute and relative system of measurement) and Practice drawing by using following tools: Grid, snap, O-snap, Lines, Erase, Zoom.
3. Study and create drawing by using Drawing tools: Circle, arcs, rectangle, polygon, ellipse, Editing tools: trim, move, copy, rotate and practice of drawing using these commands.
4. Study and create drawing by using Geometry modifying tools: fillet, chamfer, scale, stretch
5. Study and create drawing by using copying tools like array, mirror, block and offset.
6. Study and detailing of drawing by using dimensioning and annotations tools.
7. Study and create drawing with different types of line by using Layer command
8. Create geometry by modify it by using Scales- plane and diagonal scale and create conics sections- ellipse, parabola, hyperbola, rectangular hyperbola, involutes.
9. Draw regular solids: Cube, Prism, Pyramid, Cylinder, Cones
10. Draw sectional views of solids- Cube, Prism, Pyramid, Cylinder, Cones.

Chhattisgarh Swami Vivekanand Technical University (CSVTU), Bhilai (CG)

SCHEME OF TEACHING AND EXAMINATION

Courses of Study and Scheme of Examination of Q1 Group
B Tech (Second Semester - Common to all Branches of Engineering) 2019-20

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code	Period per Week			Scheme of Examination Theory/Lab			Total Marks	Credit
				L	T	P	ESE	CT	TA		
1.	Basic Sciences	Chemistry-I	A000211(011)	3	1	-	100	20	30	150	4
2.	Basic Sciences	Mathematics-II**	A000212(014)	3	1	-	100	20	30	150	4
3.	Computer Science	Programming for Problem Solving	A000213(022)	3	-	-	100	20	30	150	3
4.	Humanities	English	A000214(046)	2	-	-	100	20	30	150	2
5.	Civil Engineering	Basic Civil Engineering and Mechanics	A000216(020)	3	-	-	100	20	30	150	3
6.	Basic Sciences	Chemistry (Lab)	A000221(011)	-	-	2	40	-	20	60	1
7.	Computer Science	Programming for Problem Solving (Lab)	A000222(022)	-	-	4	40	-	20	60	2
8.	Civil Engineering	Basic Civil Engg. & Mechanics (Lab)	A000223(020)	-	-	2	40	-	20	60	1
9.	Mechanical Engineering	Workshop Practice/ Manufacturing Process (Lab)	A000224(037)	-	1	4	40	-	20	60	3
10.	Humanities	Language (Lab)	A000225(046)	-	-	2	-	-	10	10	1
			Total Marks	**14**	**3**	**14**	**660**	**100**	**240**	**1000**	**24**

L-Lecture, T-Tutorial, P-Practical, ESE-End Semester Exam, CT- Class Test, TA-Teacher's Assessment

Note :

(a)   The teaching in the 1st and 2nd Semester will be divided in two groups consisting of various branches as shown below :

P1-GROUP : Electronics & Telecommunication, Mechanical, Civil, Mining, Applied Electronics & Instrumentation, Metallurgy, Mechatronics, Automobile, Production Engineering, Fashion and Apparel Engineering

Q1-GROUP : Computer Science, Information Technology, Electronics & Instrumentation, Electrical, Chemical, Electrical & Electronics, Plastic Engineering, Agriculture Engineering, Biotechnology

(b)   ****Mathematics-II will be taught to both the groups in the second semester.**

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd
Subject: Chemistry-I
Total Marks in End Semester Exam: 100
Minimum number of Class Tests: 02

Branch: Common to all Branches
Course Code: A000211(011)
L: 3 T: 1 P: 0   Credits: 4

Unit I – V is common for all braches except Chemical Engineering

Unit VI – X are specific to Chemical Engineering

Unit – I
Atomic & molecular structure   10 hours

Molecular orbital Theory: Equations for atomic and molecular orbitals (LCAO), Energy level diagram of homo (H_2, N_2, O_2, Li_2, F_2) & hetero molecules (CO, NO, HF), Concept of bond order. Pi-molecular orbitals of butadiene, benzene and aromaticity.

Crystal Field Theory: Splitting of d-orbital of octahedral and tetrahedral complexes, Energy level diagram of transition metal ion & magnetic property, numerical based on Crystal field stabilization energy.

Unit – II
Spectroscopic techniques and applications   10 hours

Principle of spectroscopy. Electromagnetic radiation, Spectrophotometer (line diagram)

Electronic Spectroscopy (Ultraviolet–visible spectroscopy): Theory, Types of electronic transition, Chromophore, auxochromes , Electronic excitation in conjugated dienes , Absorption Laws, applications on quantitative analysis , Simple numerical based on absorption laws and uses or application of Electronic Spectroscopy

Vibrational spectroscopy (Infrared spectroscopy): Molecular vibration, Selection rule, functional group region, fingerprint region and uses or application of Vibrational spectroscopy.

Nuclear magnetic resonance spectroscopy: Introduction, number of signal, chemical shift, Spin-spin coupling and uses or application of Nuclear magnetic resonance spectroscopy.

Unit – III   8 hours
Use of free energy in Chemical Equilibria

Thermodynamic Functions: Energy, Entropy, Free energy, Cell potential & related numericals, Estimations of entropy and free energies, Nernst Equation & its application to voltaic cell, Relation of free energy with EMF.

Corrosion: Electrochemical theory of corrosion, galvanic series, Galvanic corrosion, Differential aeration corrosion, Pitting, and Water line corrosion, Caustic embrittlement, factors affecting corrosion , Cathodic Protection.

Unit –IV
Periodic properties   8 hours

Periodic table, atomic and ionic radii, ionisation energies, electron affinity, electronegativity.

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms. Polarizability, Oxidation states, coordination numbers and geometries, Hard, soft acids and bases (Classification, Pearsons HSAB principle , its applications & limitations) Molecular Geometry (Valence shell electron pair repulsion theory to NH_3, H_3O+, SF_4, ClF_3, ICl_2 and H_2O), Numerical based on effective nuclear charge.

Unit -V   8 hours
Organic reactions and synthesis of drug molecule

Introduction to reactions involving substitution (free radical-Chlorination of molecule, Gomberg reaction, Wurtz reaction, Electrophilic, Nucliophilic-SN^1 SN^2), Addition (Electrophilic–Morkownihoff rule,Nuclophilic)Elimination (α elimination , β elimination , unimolecular E_1, biomolecular E_2), oxidation (Baeyer villiger oxidation), reduction (Clemmensen reduction, Wolff-Kishner reduction) cyclization (Bergman Cyclization) and ring openings and rearrangement reaction (Beckamann, Reimer-Tiemann reaction, Canannizaro, crossed cannizzaro reaction)

Synthesis of a commonly used drug molecule: General guidelines of drug making, synthesis of Aspirin, Ibuprofen, Paracetamol.

Unit -VI
Introduction to quantum theory   8 hours

Schrodinger equation & its importance, Applications to hydrogen atom, Wave mechanical model for many electron atoms-radial distribution curves.

Unit -VII   10 hours
Chemical bonding in molecules:

MO theory, Structure, bonding and energy levels of bonding and shapes of many atom molecules, Coordination Chemistry, Electronic spectra and magnetic properties of complexes with relevance to bio-inorganic chemistry, organometallic chemistry.

Unit -VIII   8 hours
Stereochemistry:

Introduction to Stereochemistry: Representations of 3 dimensional structures, Chirality, Optical activity. Isomerism- structural isomerism, stereoisomers, enantiomers, diastereomers, Configurations (D, L &R, S), Geometrical isomerism (cis and trans & E and Z). Racemic modification & their resolution, Isomerism in transitional metal compounds.

Conformational analysis: Conformations of cyclic (cyclohexane) and acyclic compounds (ethane & butane).

Unit -IX
Reactivity of organic molecules: 8 hours
Organic acids and bases: factors influencing acidity, basicity, and nucleophilicity of molecules, kinetic vs. thermodynamic control of reactions.

Unit -X   10 hours
Strategies for synthesis of organic compounds:

Reactive intermediates substitution, elimination, rearrangement, kinetic and thermodynamic aspects, role of solvents.

Course Outcomes:

The concepts developed in this course will aid in the quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbital's and intermolecular forces.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- Rationalise bulk properties and processes using thermodynamic considerations.
- Rationalise periodic properties such as ionisation potential, electro negativity, Oxidation states.
- List major to significant chemical reactions that are used in the synthesis of molecules.
- Use the knowledge of quantum theory in various chemical systems.
- Appreciate aliphatic chemistry and stereochemistry
- Write simple mechanisms

Text Books:

1. A. Text Book of Engg. Chemistry, Shashi Chawala, Dhanpat Rai & Co. (P) Ltd.
2. Engineering Chemistry by P. C. Jain (Dhanpat Rai Publishing Company.
3. Engineering Chemistry, Concept in engineering Chemistry by Satyaprakash and Manisha Agrawal by Khanna Publication.

Books for Chemical Engineering:

1. Advanced Inorganic Chemistry Vol 1 & II by Gurdeep Raj, Goel Publishing House.
2. Organic Reaction and Their Mechanism P. S. Kalsi, New Age International Publishers.

Reference Books:

1. University chemistry, by B. H. Mahan
2. Chemistry: Principles and Applications, by M. J. Sienko and A. Plane
3. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
5. Physical Chemistry, by P. W. Atkins
6. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition
7. Essentials of Physical Chemistry, Bahi & Tuli, S. Chand Publishing
8. Introduction to Nanoscience by S. M. Lindsay

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd

Branch: Common to all Branches

Subject: Mathematics - II

Course Code: A000212(014)

Total Marks in End Semester Exam: 100

L: 3 T: 1 P: 0   Credits 4

Minimum number of Class Tests: 02

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. More precisely, the objectives are:

- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- To introduce effective mathematical tools for the solutions of differential equations that model physical processes.
- To introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.

UNIT I
Multivariable Calculus (Integration)   (8 hours)
Double and triple integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian),

Orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes (without proof) & its applications.

UNIT II
First order ordinary differential equations   (8 hours)
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.

UNIT III
Ordinary differential equations of higher orders   (8 hours)
Higher order linear differential equations with constant coefficients & variable coefficients, method of variation of parameters, Cauchy-Euler equation.
Power series solutions; Legendre polynomials and their properties, Bessel functions of the first kind and their properties.

UNIT IV
Complex Variable – Differentiation   (8 hours)
Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

UNIT V
Complex Variable – Integration (8 hours)
Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series. Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems,9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice HallIndia, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd
Subject: Programming for Problem Solving
Total Marks in End Semester Exam: 100
Minimum number of Class tests: 02

Branch: Common to all Branches
Course Code: A000213(022)
L: 3 T: 0 P: 0   Credits: 3

Course Objectives:
- To learn the Computer Fundamental concepts
- To aware students about Problem Solving approach
- To make them to use basic components of Programming

Unit I: Introduction   (4 lectures)

Introduction to Programming, Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.), Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart, Pseudo code and Source code with examples.

Unit II: Programming Concepts   (9 lectures)

Variables, data types, memory locations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions and precedence, Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching, Iteration and loops.

Unit III: Arrays   (9 lectures)

Introduction to Arrays (1-D, 2-D), Character arrays and Strings, Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required).

Unit IV: Function   (9 lectures)

Definition, prototyping, built in libraries, Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, Recursion: Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit V: Structure   (9 lectures)

Defining structures and Array of Structures, Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), bit-fields.
File handling: concept of a file, text files and binary files, Formatted I/O, file I/O operations, example programs

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Course Outcomes:
The student will learn-
- To formulate simple algorithms for arithmetic and logical problems.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd

Subject: English

Total Marks in End Semester Exam: 100

Minimum number of Class Tests: 02

Branch: Common to all Branches

Course Code: A000214(046)

L:2 T:0 P:0 Credits: 2

UNIT – I
Vocabulary Building

1.1 Root words from foreign languages and their use in English

1.2 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.

1.3 Synonyms, antonyms, Homonyms and Homophones.

1.4 One Word Substitution

1.5 Basics of Phonetics: Definitions, Phonetic Symbols, Transcription of one and two syllable words

1.6 Communication: Definition, Cycle, Elements, 7Cs & Barriers

UNIT – II
Basic Writing Skills

2.1 Types of Sentences and Tenses, Voices and narration

2.2 Use of phrases and clauses in sentences

2.3 Importance of proper punctuation

2.4 Creating coherence

2.5 Techniques for writing precisely

UNIT – III
Identifying Common Errors in Writing

3.1 Parts of speech, Subject-verb agreement

3.2 Noun-pronoun agreement

3.3 Misplaced modifiers

3.4 Articles

3.5 Prepositions

3.6 Redundancies

3.7 Clichés

3.8 Errors in Spelling/ Misspelled words

UNIT – IV
Writing Practices

4.1 Comprehension

4.2 Précis Writing

4.3 Essay Writing

4.4 Business Letters & Job Application

4.5 Formal Reports: Components & Characteristics

4.6 Writing e-mails

UNIT – V
Listening

5.1 Listening: Definition, purposes, types, and strategies to improve listening.

5.2 Characteristics of effective listening.

5.3 Barriers to Listening and measures to overcome barriers

5.4 Note making: types and conversion of notes into texts.

UNIT – VI
Oral Communication (This unit involves interactive practice sessions in Language Lab)

6.1 Listening Comprehension

6.2 Pronunciation, Intonation, Stress and Rhythm

6.3 Common Everyday Situations: Conversations and Dialogues

6.4 Communication at Workplace

6.5 Interviews

6.6 Formal Presentations

Course Outcomes:

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

Suggested Books:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
7. English and Communication Skills for Students of Science and Engineering. S.P. Dhanavel. Orient Blackswan Ltd.2009.
8. Scientific English: A Guide for Scientists and Other Professionals. R A Day. Universities Press. 2000.
9. Word Power Made Easy. Norman Lewis. W R Goyal Publishers and Distributors. Publishers. 2009
10. Textbook of English Phonetics for Indian Students. T Balasubramaniam. Macmillan Publishers.2012
11. Technical Communication: Principles and Practice. Meenakshi Raman and Sangeeta Sharma. Oxford University Press. 2015.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd

Subject: Basic Civil Engineering & Mechanics

Total Marks in End Semester Exam: 100

Minimum number of Class Tests: 02

Branch: Common to all Branches

Course Code: A000216(020)

L: 3 T: 0 P: 0   Credits: 3

Course Objectives:

- To introduce about the properties of common building materials to the students.
- To introduce the basic concepts of concrete and foundation to the students.
- To introduce the basic concepts of surveying & levelling to the students.
- To introduce the basic concepts of general system of forces to the students.
- To introduce the simple methods of analyzing truss to the students.

UNIT - I
Building Material
Qualities of good brick, Water absorption and Compressive Strength test for bricks. Types of Cement, Ingredients of Portland cement and their functions, Fineness, Setting Times and Compressive Strength of Cement, Functions of Sand in mortar, Mortar Mix proportions for various uses.

UNIT – II
Building Construction
Ingredients of Cement Concrete, Grades of Concrete, proportions for Nominal mix concrete, Workability & Compressive Strength of Concrete, Curing of Concrete.

Necessity of foundations, Definitions of Safe bearing capacity, Ultimate bearing capacity and factor of safety, Difference between Load Bearing & Framed Construction.

UNIT - III
Surveying & Levelling
Principles of Surveying, Technical terms, Calculation of reduced level by Height of instrument and Rise & Fall method, Simple problems in levelling.

UNIT – IV
General System of Forces
Equations of equilibrium for a system of concurrent forces in a plane.Constraint, Action and Reaction.Types of support and support reactions. Free Body Diagram – Body subjected to two forces & Body subjected to three forces. Moment of a force. Theorem of Varignon, Equations of Equilibrium.

UNIT –V
Analysis of Plane Trusses
Engineering Structures, Rigid or perfect Truss, Determination of Axial forces in the members of truss, Method of Joints, Method of Sections.

Course Outcomes:

After completing the course students should be able to

- Identify the properties of common building materials.
- Understand basic concepts of concrete and foundation.
- Understand the basic concepts of Surveying & levelling.
- Understand the basic concepts of general system of forces.
- Analyze truss by simple methods.

Text books:

1. Comprehensive Basic Civil Engineering B.C. Punmia
2. Building construction by Ahuja and Birdi
3. Engineering Mechanics by A. K. Tayal

Reference books:

1. Basic Civil Engineering by Ramamurutham
2. Engineering Mechanics by R. K. Bansal

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd **Branch: Common to all Branches**
Subject: Chemistry-I (Lab) **Course Code: A000221(011)**
Total Marks in End Semester Exam: 40 **L: 0 T: 0 P: 2   Credits: 1**

List of Experiments:

Choice of 8 – 10 experiments from the following:

1. Determination of surface tension and viscosity.
2. Thin layer chromatography.
3. Ion exchange column for removal of hardness of water.
4. Determination of chloride content of water.
5. Colligative properties using freezing point depression.
6. Determination of the rate constant of a reaction.
7. Determination of cell constant and conductance of solutions.
8. Potentiometry - determination of redox potentials and emfs.
9. Synthesis of a polymer/drug/ organic compounds.
10. Saponification/acid value of oil.
11. Chemical analysis of salt / organic compounds.
12. Lattice structures and packing of spheres.
13. Models of potential energy surfaces.
14. Chemical oscillations- Iodine clock reaction.
15. Determination of the partition coefficient of a substance between two immiscible liquids.
16. Adsorption of acetic acid by charcoal.
17. Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the Ph of minimum viscosity for gelatin sols and/or coagulation of the white part of egg .
18. Spectrophotometric determination.

Course Outcomes:
The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyse a salt sample

Text Books:

1. Laboratory Manual Engg. Chemistry, Anupama Rajput, Dhanpat Rai & Co. (P) Ltd.
2. Laboratory Manual on Engg. Chemistry, S. K. Bhasin& Sudha Rani, Dhanpat Rai & Co. (P) Ltd.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2nd   **Branch: Common to all Branches**

Subject: Programming for Problem Solving (Lab)   **Course Code: A000222(022)**

Total Marks in End Semester Exam: 40   **L: 0 T: 0 P: 4   Credits: 2**

The laboratory should be preceded or followed by a Practical Lecture to explain the approach or algorithm to be implemented for the problem given.

Practical Lecture (L T P) – 0 0 1	Lab. work (L T P) – 0 0 3
Practical Lecture 1: Problem solving using computers	**Lab1**: Familiarization with programming environment
Practical Lecture 2: Variable types and type conversions	**Lab 2**: Simple computational problems using arithmetic expressions
Practical Lecture 3: Branching and logical expressions	**Lab 3**: Problems involving if-then-else structures:
Practical Lecture 4: Loops, while and for loops	**Lab 4**: Iterative problems e.g., sum of series
Practical Lecture 5: 1D Arrays: searching, sorting	**Lab 5**: 1D Array manipulation
Practical Lecture 6: 2D arrays and Strings	**Lab 6**: Matrix problems, String operation
Practical Lecture 7: Functions, call by value	**Lab 7**: Simple functions
Practical Lecture 8 & 9: Numerical methods (Root finding, numerical differentiation, numerical integration):	**Lab 8 & 9**: Programming for solving Numerical methods problems
Practical Lecture 10: Recursion, structure of recursive calls	**Lab 10**: Recursive functions
Practical Lecture 11: Pointers, structures and dynamic memory allocation	**Lab 11**: Pointers and structures
Practical Lecture 12: File handling	**Lab 12**: File operations

Laboratory Outcomes
- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program• To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them
- through a program
- To be able to declare pointers of different types and use them in defining self referential structures.
- To be able to create, read and write to and from simple text files.

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.

Reference Books :
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Semester: B.Tech – 2ⁿᵈ   **Branch: Common to all Branches**
Subject: Basic Civil Engineering & Mechanics (Lab)   **Course Code: A000223(020)**
Total Marks in End Semester Exam: 40   **L: 0 T: 0 P: 2   Credits: 1**

List of Experiments:

1. Water Absorption test on bricks.
2. Compressive strength test on bricks.
3. Fineness of cement by sieve analysis.
4. Initial setting time of cement.
5. Compressive Strength test of Cement.
6. Sieve analysis and F.M. of fine aggregate.
7. Sieve analysis and F.M. of coarse aggregate.
8. Compressive strength test of Concrete.
9. Difference in level between two given stations by Height of Instrument method.
10. Difference in level between two given stations by Rise & Fall method.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.Tech – 2ⁿᵈ

Branch: Common to all Branches

Subject: Workshop Practice/Manufacturing Process (Lab)

Course Code: A000224(037)

Total Marks in End Semester Exam: 40

L:0 T:1 P:4   Credits: 3

Course Objective:

The course is designed to meet the following objectives.

- Acquire skills in engineering practice.
- To identify tools, work materials and measuring instruments for different trades.

Unit I:
Forging: Introduction to manufacturing process, and its classification, use of various forging tools, forging operations, forging defects.
Suggested Jobs: Forging of chisel, forging of screw driver.

Unit II:
Carpentry: Different types of wood, carpentry tools, different joints, polishing, wood working Lathe.
Suggested Jobs: Making of name plate, stools and a small job on wood working lathe.

Unit III:
Fitting Shop: Introduction to bench working. Work holding devices, measuring instruments, fitting tools and their specification, types of joints fitting operations.
Suggested Jobs : Preparation of job by use of filling, sawing, chipping, drilling and tapping operations.

Unit IV: Moulding: Pattern materials, allowances, moulding terminology.
Suggested Jobs : Prepare moulds of patterns, casting small household objects like paper-weight etc.

Unit V: Welding: Study and use of gas, Arc, soldering, brazing methods. Safety precaution.
Suggested Jobs : Preparing Lap and Butt joints by gas and arc welding method.

Unit VI: Metal Cutting: Common machining operations, different machine tools, cutting tools materials, different type of Lathes, Lathe operations, shaper and its specification. Quick return mechanism of shaper.
Suggested Jobs : Making small shaft, cutting screw thread on Lathe.

Course Outcomes:-

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Text Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.
3. B.S. Raghuvanshi, Workshop Technology, Vol I&II, Dhanpat Rai & Sons.

Reference Books:

1. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.
2. Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.
3. Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
4. M.L.Begeman and B.H.Amstead, Manufacturing Process, Wiley
5. W.A.J.Chapman and E. Arnold, Workshop Technology, Vol I, II, & III, CRC Press, Prentice Hall
6. V. Narula, Workshop Technology, S.K. Kataria and sons.