Jabalpur Engineering College, Jabalpur

(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) I Semester (CE/ME/CS/MT Group A)

w.e.f. July 2023

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory			Practical			L	T	P	
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work					
1	BT11	BSC	Engineering Chemistry	70	20	10	30	20	150	3	-	2	4
2	BT12	BSC	Mathematics-I	70	20	10	-	-	100	3	1	-	4
3	BT13	HSMC	English	70	20	10	-	-	100	3	-	-	3
4	BT14	ESC	Basic Electrical and Electronics Engineering	70	20	10	30	20	150	3	-	2	4
5	BT15	ESC	Engineering Graphics	70	20	10	30	20	150	2	-	4	4
6	BT16	ESC	Manufacturing Practice/ Workshop	-	-	-	30	20	50	-	-	2	1
7	BT17	HSMC	Seminar/Soft Skils	-	-	-	30	20	50	-	-	2	1
			Total	**350**	**100**	**50**	**150**	**100**	**750**	**14**	**1**	**12**	**21**
8	BT18	MC	Induction Program of first three weeks	Physical activity, creative arts, universal human values, Literary proficiency Modules, Lectures by Eminent People, visits to local areas, Familiarization to department/ branch & innovation.									
9	BT19	MC	NSS/NCC/Swatchhata Abhiyan/Rural Outreach	Qualifier									

1 hour lecture (L) = 1 credit	1 hour Tutorial (T) = 1 credit	2 hour Practical (P) = 1 credit

BSC: Basic Science Course, HSMC: Humanities & Social Sciences including Management Course, ESC: Engineering Science Course, MC: Mandatory Course,

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(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) I/II Semester
Branch- Common to All Disciplines
COURSE CONTENTS

w.e.f. July 2023

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
		End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work		L	T	P	4
BT11	Engineering Chemistry						150				
		70	20	10	30	20		3	-	2	

Course Contents:

Module -1 Water – Analysis, Treatments, Boiler problem & softening methods

Sources, Impurities, Hardness & its units, Determination of hardness by EDTA method, Alkalinity & It's determination and related numerical problems. Boiler troubles (Sludge & Scale, Priming & Foaming, Boiler Corrosion, Caustic Embrittlement), Softening methods (Lime-Soda, Zeolite and Ion Exchange Methods) and related numerical problems.

Module -2 Fuels & Combustion

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter. Proximate and Ultimate analysis of coal and their significance, calorific value. Carbonization, Manufacturing of coke. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between knocking & Structure of hydrocarbon, improvement of anti-knocking. Characteristics of IC engine fuels & Diesel engine fuels, Octane number, Cetane number, combustion and its related numerical problems. Gaseous and bio fuels.

Module -3 Lubricants and Lubrication

Introduction, Mechanism of lubrication, Classification of lubricants, significance & determination of Viscosity and Viscosity Index, Flash & Fire Points, Cloud & Pour Points, Iodine Value, Aniline Point, Acid Number, Saponification Number, Steam Emulsification Number and related numerical problems. Solid lubricants, Semi-solid lubricants.

Module -4 Polymer & Polymerization

Introduction, types of polymerisation, Classification, mechanism of polymerisation (Free radical & Ionic polymerization). Thermoplastic & Thermosetting polymers, Elementary idea of Biodegradable polymers, preparation, properties & uses of the following polymers- PVC, PMMA, Teflon, Nylon 6, Nylon 6:6, Polyester Phenol formaldehyde, Urea- Formaldehyde, Buna N, Buna S, Vulcanization of Rubber.

Module -5 Spectroscopic and Chromatographic techniques
Principle, Instrumentation & Applications, Electronic spectroscopy, Vibrational & Rotational spectroscopy. Gas chromatography and its applications.

Cement and Refractories:
Classification of Cements, Manufacture of Portland cement. Chemical composition and ISI specifications, Setting and Hardening. Decay of Cement, Gypsum, Plaster of Paris, Concrete & RCC. Definition, Classification & Properties of Refractory materials. Properties & uses of Silica bricks, Fire clay, Carborundum & Dolomite.

Practical List

NOTE: At least 8 of the following core experiments must be performed during the session.

1. Water testing
(i) Determination of Total hardness by Complexometric titration method.
(ii) Determination of mixed alkalinity
(a) OH^- & CO_3^{--} (b)CO_3^{--} & HCO_3^-

(iii) Chloride ion estimation by Argentometric method.

2. Fuels & Lubricant testing:
(i) Flash & fire points determination by
   a) Pensky Martin Apparatus,   b) Abel's Apparatus
   c) Cleveland's open cup Apparatus   d) Calorific value by bomb calorimeter.
(ii) Viscosity and Viscosity index determination by
   a) Redwood viscometer No.1   b) Redwood viscometer No.2
(iii) Proximate analysis of coal
   a) Moisture content   b) Ash content
   c) Volatile matter content d) Carbon residue
(iv) Steam emulsification No & Anline point determination
(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis
(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.
(ii) Determination of Cu and or Cr in alloys by Iodometric Titration.
(iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

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Reference Books :

1. Chemistry in Engineering and Technology - Vol.1 &2 Kuriacose and Rajaram , McGraw Hill Education
2. Fundamental of Molecular Spectroscopy C.N. Banwell , McGraw Hill Education
3. Engineering Chemistry – B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
4. Basics of Engineering Chemistry – S.S. Dara & A.K. Singh, S. Chand &Company Ltd., Delhi.
5. Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
6. Elementary Spectroscopy ,Y .R. Sharma , S. Chand Publishing
7. Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd
8. Theory and Practicals of Engineering Chemistry, Shashi Chawla, Dhanpat Rai & Co. (Pvt.) Ltd.
9. Engineering Chemistry (NPTEL Web-book) B.L. Tembe, Kamaluddin and M.S. Krishna
10. Engg. Chemistry, Jain & Jain, Dhanpat Rai Publishing Company (P) Ltd.

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Identify the quality of water for industrial and municipal applications
CO2	Determine the use of fuels for engineering applications
CO3	Determine the use of Lubricants for engineering applications
CO4	Select the appropriate polymers for desired applications
CO5	Apply the fundamentals of spectroscopic and chromatographic techniques , to acquire knowledge of engineering materials like Cement and Refractories

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Mapping of course outcome with program outcome

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-
CO5	3	1	-	-	-	-	-	-	-	-	-	-

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Determine the concentration of an unknown solution using redox titration
CO2	Determine the total hardness of a given water sample
CO3	Identify and determine the type and amount of alkalinity
CO4	Proximate analysis of coal. Determine viscosity, flash and fire point of various lubricating oil using popular techniques

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Prof & Head
Applied Chemistry Deptt
Govt. Engineering College
JAB ....

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Bachelor of Technology (B.Tech.) I Semester (Common to all Disciplines)

COURSE CONTENT   w.e.f. July 2023

Subject Code	Subject Name	Maximum marks Allotted			Total marks	Hours/Week			Total Credit
		Theory				L	T	P	
BT12	MATHEMATICS-I	End Sem	Mid-Sem Exam	Quiz/ Assignment	100	3	1	0	4
		70	20	10					

Module 1: Calculus-I (08 hours)
Rolle's theorem, Mean value theorem, Expansion of functions by Maclaurin's and Taylor's theorem, Partial differentiation, Homogeneous functions, Euler's theorem, Maxima and Minima of two variables, Method of Lagrange's multipliers.

Module 2: Calculus-II (08 hours)
Definite integral as limit of a sum, Application in summation of series, Double integrals, Change of order of integrals, Triple integrals, Length of curves, Area and Volume of surfaces using double and triple integrals, Beta and Gamma functions and their properties.

Module 3: Sequences, Series and Laplace Transform (10 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. Laplace Transform, Inverse Laplace transform.

Module 4: Matrices (06 hours)
Rank of Matrix, Solution of simultaneous equations by elementary transformation and consistency of equations, Eigen values and Eigen vectors, Cayley-Hamilton theorem and its application to find the inverse of matrix, Diagonalisation of matrices.

Module 5: Vector Space (08 hours)
Vector Space, Linear dependence of vectors, Basis, Dimension; Linear transformations (maps) range and kernel of a linear map, Rank and Nullity, Inverse of a linear transformation, Rank-Nullity theorem, composition of linear maps, Matrix associated with a linear map.

Books References:

1. G.B. Thomas and R.I. Finney, Calculus and Analytic geometry, 9th Edition, Pearson. Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
3. Veerarajan T, Engineering Mathematics for first year. Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V. Higher Engineering Mathematics, Tata McGraw-Hill, New Delhi. 11th Reprint. 2010.
5. D. Poole, Linear Algebra: A modern Introduction, 2nd Edition, Books/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 36th Edition. 2010.

Course Outcomes:

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

1. Apply differential and integral calculus to notions of curvature and to improper integrals.
2. Understand basic knowledge of Beta and Gamma functions , functions of several variables.
3. Apply the fallouts of Rolle's Theorem of analysis to Engineering problems.
4. Determine the tool of power series and Fourier series, Laplace transform for learning advanced Engineering Mathematics.
5. Solve various problems using matrices and linear algebra in a comprehensive manner.

Dr. O. P. Chauhan
H.O.D.
Deptt. of App. Mathematics

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Common for all disciplines

Sr. no	Subject code	Subject Category	Subject Name	Maximum Marks Allotted							Hours Per week			Total credits
				Theory			Practical							
				End Sem	Mid term test	Quiz/ Assign	End Sem	Lab work		Total Marks	L	T	P	
1	BT13	HSMC	English	70	20	10				100	3	-	2 hrs	3
2	BT17	HSMC	Seminar/ Soft Skills	-	-	-	30	20		50			2 hrs	1
3	BT26	HSMC	Language Lab	-	-	-	30	20		50	-	-	2 hrs	1

Course Outcomes: At the end of the course the students will be able to:

CO1	Understand the basic rules of grammar precise writing, summary writing and comprehend passage
CO2	Develop the skills of composing different types of business letters, To learn an acceptable layout of a formal letter and method of writing job application
CO3	Apply and demonstrate the necessary writing skills to prepare and complete a report professionally. It will also provide them with the critical skills to evaluate their subject and present conclusions and recommendations objectively
CO4	Apply the skills of oral and interpersonal communication along with listening skills
CO5	Demonstrate the ability to read and evaluate the various genres of English Language and make proper use of voice modulation and express punctuation marks through voice inflection.

Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1				3		
CO2						1				3		
CO3								1	2	3		
CO4								1	2	3		
CO5								2		3		

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Common for all disciplines

COURSE CONTENT   w.e.f. July 2023

Subject Code	Subject Category	Subject Name	Maximum Marks Allotted					Total marks	Hours per week	Total Credits
			Theory			Practical				
			End Sem	Mid-Sem	Quiz/ Assignment	End Sem	Lab Work			
BT13	HSMC	English	70	20	10	-	-	100	3	3

Module 1:
Words, morphemes (suffixes & prefixes), phrases, clauses, kinds of sentences; Review of Basic Grammar: tenses, narration, active passive voice, prepositions, articles, gerunds, subject-verb agreement, punctuation marks, Paragraph Writing, Precis writing, Comprehension Paragraph CO1

Module 2:
Business Correspondence: Letters- Components and Layouts, Principles of Effective Letter Writing Applications, Enquiry Letters, Quotations Letters, Order and Complaint letters, Adjustment letters, Job Application: Cover Letter, Resume Writing, the difference between , CV and resume,. E-mail etiquette CO2

Module 3:
Meaning and Process of Communication, Barriers to Communication, Verbal and Nonverbal Communication, Job Interview Skills: Pre-Interview Preparation Techniques, Facing the Interview; Group discussion strategies, Presentation Skills; Listening skills: Importance of listening, Types of listening, Difference between listening and hearing, CO4

Module 4:
Report Writing: Basics of Report Writing, Types of Report: Information and Analytical Report, Routine and Special Reports, Formal and Informal Reports; Formats of Report: Letter text combination format of the report, Printed Form, and Memo Format; Process of Report Writing, Writing Bibliographies (single and two authors) and References. CO3

Module 5:
Different types of reading techniques, Portrait of a Lady by Khushwant Singh, Lord Ullin's Daughter by TC Campbell, Letter to God by G.L. Fuentes, How Much Land does a Man Need. CO5

References:
1. Technical Grammar and Composition, Wren and Martin.
2. Effective Technical Communication, M Ashraf Rizvi Tata McGraw Hill, New Delhi.
3. Essentials of Business Communication, Rajendra Pal and J.S Koriahalli, Sultan Chand and Sons, New Delhi
4. Business Correspondence and Report Writing, R.C. Sharma and Krishna, Mohan McGraw Hill, New Delhi.
5. Technical Communication: Principles and Practices Meenakshi Raman and Sangeeta Sharma, Oxford University Press, New Delhi.
6. Business communication, Lesikar, and Petit, McGraw Hill, New Delhi.

Course Outcomes:
- Understand the basic rules of grammar precise writing, summary writing and comprehend passage
- Develop the skills of composing different types of business letters, To learn an acceptable layout of a formal letter and method of writing job application
- Apply and demonstrate the necessary writing skills to prepare and complete a report professionally. It will also provide them with the critical skills to evaluate their subject and present conclusions and recommendations objectively
- Apply the skills oral and interpersonal communication along with listening skills.
- Demonstrate the ability to read and evaluate the various genres of English Language and make proper use of voice modulation and express punctuation marks through voice inflection.

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w.e.f.July 2023

Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Total Credits
		Theory			Practical						
		End Sem	Mid-Sem Exam	Quiz/ Assignment	End Sem	Lab work	Total Marks	L	T	P	
BT14	Basic Electrical & Electronics Engineering	70	20	10	30	20	150	3	-	2	4

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Module 1: Fundamentals of Electrical Technology:
Electric Network, voltage and current sources, source transformation, Kirchhoff's laws, Mesh current method (loop analysis), nodal analysis, Delta-Star and Star-Delta transformation, superposition theorem, Thevenin's theorem, Norton's theorem.

Module 2: AC Circuits:
Generation of sinusoidal AC voltage, Average value, R.M.S. value, Form factor peak factor of AC quantity, Concept of phasor, Concept of power factor, Concept of impedance, admittance, Active, reactive and apparent power. Analysis of R-L, R-C, R-L-C series & parallel circuit
3-phase AC Circuits: Necessity and advantages of three phase systems, Meaning of Phase sequence, balanced and unbalanced supply and loads. Relationship between line and phase values for balanced star and delta connections. Power in balanced & unbalanced three-phase system and their measurements

Module 3.:Magnetic Circuits :
Basic definitions, self-inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field and force calculation of a current carrying conductor. Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F.

Single phase transformer- General construction, working principle, e.m.f. equation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and Short circuit test.

Module 4: Electrical Machines:
Construction, Classification & Working Principle of DC machine, induction machine and synchronous machine. Working principle of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor Types of losses occurring in electrical machines. Applications of DC machine, induction machine and synchronous machine

Module 5:- Basic Electronics:

Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations.

Number systems & Their conversion used in digital electronics, DE Morgan's theorem, Logic Gates, Simplification of Boolean function, NAND & NOR Gate implementation, Karnaugh map (K-Map)

Test Book:

5. D.P. Kothari & I.J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, Fourth Edition.
6. S.N. Singh, "Basic Electrical Engineering", P.H.I.,2013 Edition.
7. Rajendra Prasad, "Fundamentals of Electrical Engineering", P.H.I.,Third Edition.
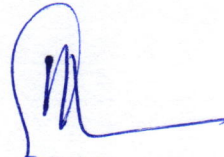**8.** J.B. Gupta, "Basic Electronics", Second Edition.

Reference books:

5. M.S. Sukhija, T. K. Nagsarkar, "Basic Electrical and electronics engineering", Oxford University press, 2012 , First Edition.
6. C.L. Wadhwa, "Basic Electrical Engineering", New Age International, Fourth Edition.
7. B.L. Theraja & A.K Theraja "Textbook of Electrical & Electronics Engineering - Vol. 1", S. Chand Publication, Twenty Third Edition.
8. V.K Mehta & Rohit Mehta, "Principles of Electronics", S. Chand Publication, Seventh Edition.

List of Experiments:

1. Verification of Kirchhoff's laws.

2. Verification of superposition theorem.

3. Verification of thevenin's Theorem.

4. Determination of parameters of ac single phase series RL, RC & RLC circuits.

5. Active reactive power and apparent power measurement in single phase circuits.

6. Determination of equivalent circuits parameters of single phase transformer by OC and SC tests.

7. Study of V-I Characteristics of Diodes.

8. Transistor applications as amplifier and switch.

9. Verification of truth table for various gates.

10. Verification of De Morgan's theorems.

Professor & Head, Electrical Engg. Dept
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Course Code: **BT14**
Course category: ESC
Course Name: **Basic Electrical & Electronics Engineering**

Course Outcomes:

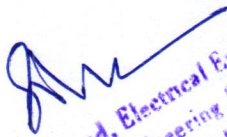After completion of this course students will be able to:

CO-1: Apply KVL, KCL and network theorem to solve basic AC and DC networks problems.

CO-2: Analyze various parameters in single phase and three phase AC circuits

CO-3: Analyze the similarities and dissimilarities of magnetic circuit; also calculate losses efficiency and voltage regulation of single phase transformer

CO-4: Draw characteristics of different electrical machines

CO-5: Draw characteristics of Diode and BJT

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COURSE CONTENTS   w.e.f. July 2023

Subject Code	Subject name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
	Engineering Graphics	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab Work		L	T	P	
BT15							150				4
		70	20	10	30	20		2	-	4	

Course Objectives:

1. To familiarize with the construction of geometrical figures.
2. To familiarize with the projection of 1D, 2D, 3D elements.
3. To familiarize with the sectioning of solids and development of surfaces.
4. To familiarize with preparation and interpretation of building drawings.

Course Contents:

Module-I

Scales: Representative factor, plain scales, diagonal scales, Comparative scale, Vernier scale, scale of chords.

Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involute, Evolute, Archimedean spiral and logarithmic spiral.

Module-II

Projection: Types of projection, orthographic projection, first and third angle projection, Projection of points and lines, Line inclined to one plane, Line inclined with both the plane, True Length and True inclination, Traces of straight lines.

Module-III

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder and cone in different positions.

Module-IV

Section of Solids: Section of right solids by normal and inclined planes; intersection of cylinders.

Development of Surfaces: Parallel line and radial - line method for right solids.

Module-V

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): introduction, Benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

Books References:

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTUBTlgaum
2. Bhatt N.D.; Engineering Drawing, Charotar
3. VenugopalK; Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyopoovan T.; Engineering drawing & Graphics using AutoCAD; vikas
7. Agrawal and Agrawal; Engineering Drawing; TMH.
8. Shah MB and Rana BC; Engg. Drawing; Pearson Education.
9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
10. Jolhe DA; Engg. Drawing an Introduction; TMH
11. Narayana K.L.; Engineering Drawing; Scitech

Course outcomes:

At the completion of this course, students will able to

CO1	Learned about different standard conventions used in drawing.
CO2	Capable to construct different scales and curves used in drawings.
CO3	Able to do orthographic projection of various drawing entities.
CO4	Skilled to produce section of solids, development of surfaces.
CO5	Able to draw isometric projections and their importance in product design.
CO6	Prepare a given drawing on computer ai4ed drafting software packages.

Mapping of the course outcomes (COs) with program outcomes (Pos):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2		1	2									
CO3			2									
CO4	1											
CO5				2	1							
CO6				1								

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Bachelor of Technology (B.Tech.) I/II Semester (All Branches)

COURSE CONTENTS   w.e.f. July 2023

Subject Code	Subject name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
		End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab Work		L	T	P	
BT16	Manufacturing practice/ workshop	-	-	-	30	20	50	-	-	2	1

Course Objectives:

1. To familiarize with the basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy shop.
2. To familiarize with the production of simple models in the concern trades.

Course Contents:

Module-I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, Black Smithy Shop, Use of various smithy tools.

Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs: Forging of chisel, Forging of Screw Driver.

Module-II

Carpentry Shop: Timber Type, Qualities of timber, Timbers grains, structure of timber, timber seasoning, timber preservation,

Wood Working tools: Wood working machinery joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints.
Suggested jobs: Name Plate, Any of the Carpentry joint like mortise or Tennon joint

Module-III

Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges calliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling, tapping Fitting operations: Chipping filling, Drilling and tapping.
Suggested Jobs: preparation of piece by making use of filling, sawing and chipping, drilling and tapping operations.

Module-IV

Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.

Moulding: Properties of good mould & Core sand, Composition of Green, Dry and Loam sand. Methods used to prepare simple green and Bench and pit mould dry sand Bench mould using single piece and split patterns.

Module-V

Welding: Study and use of tools used for Brazing, Soldering, Gas welding & Arc welding. Preparing Lap & Butt joints using gas welding and arc welding methods, Study of TIG & MIG welding processes. Safety precautions.

Books Reference:
1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol. 1 & 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.
5. Jain. R.K. Production Technology.

Evaluation:
Valuation will be continuous an integral part of the practical class followed by examination through external assessment.

WORKSHOP PRACTICE

List of experiment:

1. Pattern making shop.
   (a) Study of pattern allowances and pattern making tools.
   (b) Preparing the single piece solid pattern in pattern making tools.

2. Fitting Shop.
   (a) Study of fitting tools and operations.
   (b) Preparing square fitting job of given size.

3. Carpentry Shop.

   (a) Study of carpentry tools, machines and joints.
   (b) Preparing a carpentry job cross half joint.
4. Moulding shop.
   (a) Study of moulding tools, moulding sand and its properties.
   (b) Preparation of sand mould of given pattern.

5. Welding shop.
   (a) Study of welding tools, machines and joints.
   (b) Preparation a butt joint through electric arc welding.

6. Machine shop.
   (a) Study of machines and tools.
   (b) Preparing multi operation machine job as given shape and size on lathe machine.

7. Black smithy shop.
   (a) Study of black smithy tools and machines.
   (b) Preparing of black smithy multi operation job as given shape and size.

Course outcomes:

At the completion of this course, students will be able to

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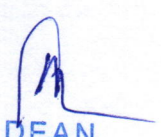Jabalpur Engineering College
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CO1	An ability to use the techniques, skill and modern engineering tool necessary for engineering practice.
CO2	Create a given job using tools and machines
CO3	Prepare carpentry, fitting, welding joints.
CO4	An ability to design and conduct experiments.

Mapping of the course outcomes (COs) with program outcomes (Pos):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1						1					
CO2		1		1		1	1					
CO3		2	2	3	1	1	1					
CO4		1	1		1							

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