UJJAIN ENGINEERING COLLEGE, UJJAIN. (MP) – 456 010

Syllabus for Four Years Bachelor of Technology Degree Course as per NEP-2020

July-2024

SUBJECT		Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title	L	T	P			
CM-1402	Fuel Technology	3	0	2	3 + 1	70	22

UNIT - I :

Solid Fuel: Coal & lignite reserves in India, Classifications of coal, Recent advances in coal preparation methods including fine coal treatment, Washing of Coal, Analysis of Coal, proximate and ultimate analysis.

UNIT - II :

Coal Carbonization : Mechanism of Low temperature carbonization & high temperature carbonization, by product recovery from coke oven; properties of coke coal; grinding, pulverization, briquetting of solid fuels.

UNIT - III :

Liquid Fuel : Origin of petroleum production, Indian Petroleum resources and their nature, Petroleum processing, distillation, cracking thermal & catalytic, coking, reforming, Isomerization, Crude oil classification, Reserves of Hydrocarbon in INDIA, introduction to Petroleum refining & processing.

UNIT - IV :

Petroleum Product : Petroleum product and their utilization, blending of petrol for octane number boosting, Transport fuels : Diesel, Petrol, AVL (Aviation Liquid Fuel), Kerosene, fuel & furnace oil, Testing of petroleum product: Flash Point, pore point, Fire point, Octane number, Cetane number, viscosity and viscosity index, API.

UNIT - V :

Gaseous Fuel: Natural gas, Synthetic gases, their composition & properties, producer gas, Water gas, Coal Gas, LPG, CNG.

References :-

1. Sarkar S. – Fuel and Combustion, 2nd Edition, Orient Long Men Ltd., Mumbai, 1996.
2. Gupta O.P. – Fuel and Combustion, 3rd Edition, Khanna Publishers, New Delhi, 1996.

List of Experiments :-

(1) To carry on proximate analysis of the given coal sample.
(2) To determine the calorific value of the coal by Bomb-Calorimeter method.
(3) Crushing, grinding, Pulverizing and Screening of solid fuel.
(4) To determine the viscosity of the given oil sample by Redwood Viscometer. No.1 & No.2.
(5) To determine the viscosity of a given oil sample by Say bolt viscometer.
(6) To determine viscosity of a given coal tar with the help of tar viscometer.
(7) To determine the flash and fire points of the given oil sample by Penskey Martin's apparatus.
(8) To determine the flash and fire points of the given oil sample by Abel's apparatus.
(9) To determine the flash and fire points of the given oil sample by Cleveland apparatus.
(10) To determine the carbon residue of the given oil by Ramsbottom method.
(11) To determine the carbon residue of the given oil by Conradson method.
(12) To find out the calorific value of a gaseous fuel (LPG) by Boy's Gas calorimeter.
(13) To determine cloud and pour point of given oil sample (coconut) by cloud and pour point apparatus.
(14) To determine the composition of given gas by Orsat apparatus.
(15) To determine the sulphur content of the given fuel oil sample by lamp method.
(16) To determine the smoke point of the given kerosene sample.

Note: Each student should perform at least eight experiments out the above list.

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SUBJECT		Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title	L	T	P			
EE-1401	Basic Electrical Engineering	2	1	2	3 + 1	70	22

UNIT - I :

D.C. Circuits : Circuit reduction by series, parallel, star delta transformation, circuit analysis by mesh and nodal method, voltage and current source representation dependent and independent sources, source conversion, superposition theorem, Thevenin s theorem.

UNIT - II :

A.C. Circuits : Generation of alternating voltages, RMS & average value, form and peak factors, phasor representation polar rectangular and exponential form, circuit parameters, R-L, R-C and RLC series and series parallel circuits. Instantaneous and average power, active and reactive power, power factor, 3-Phase balanced and unbalanced supply, star and delta connections.

UNIT - III :

Magnetic Circuits : Flux MMF and their relation, analogy between magnetic and electric circuits, saturation, B-H curves, fringing and leakage flux, AC excitation in magnetic circuits, induced voltage, hysteresis effect and eddy currents.

UNIT - IV :

Transformer : Single–phase transformer, basic concepts and constructional features, types of transformer, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test, all day efficiency.

UNIT - V :

Rotating Electrical Machine : Constructional features and working principle of DC machine, 3-phase induction motor and synchronous machine.

References :-

1. Vincent Del Toro - Electrical Engineering Fundamentals, PHI Learning.
2. Nagrath & Kothari - Basic Electrical Engineering, TMH.
3. Mittle & Mittal - Basic Electrical Engineering, III Edition TMH.
4. Cathey – Basic Electrical Engineering, Schaum Series, TMH.
5. Hughes – Electrical Technology, Pearson.
6. Fitzarald & Batham – Basic Electrical Engineering.

List of Experiments :-

(1) Verification of KCL & KVL.
(2) Study & measurement of power and power factor in R-L series circuit.
(3) Study & measurement of power and power factor in R-C series circuit.
(4) Study & measurement of power and power factor in R-L-C series circuit.
(5) Study of Transformer.
(6) Determination of equivalent circuit parameters by O.C. and S.C. test & estimation of voltage regulation & efficiency of transformer.
(7) Measurement of various lines and phase quantities for a 3 phase circuit.

UJJAIN ENGINEERING COLLEGE, UJJAIN. (MP) – 456 010

Syllabus for Four Years Bachelor of Technology Degree Course as per NEP-2020

July-2024

SUBJECT		Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title	L	T	P			
EN-1401	English	3	1	0	4 + 0	70	22

UNIT - I :

Communication and Speaking Skills : Linguistic techniques, Modern usages, Reading comprehension, Phonetics, Oral presentation, Telephonic conversation, Speech, Debate Listening skills, Communication : process, types, style, barriers.

UNIT - II :

Soft Skills for Professional Excellence : Introduction and importance of soft skills, Interpersonal & Intrapersonal communication, Leadership, Motivation, Time management, Team spirit, Self-awareness, Goal setting, Conflict management.

UNIT - III :

Business Correspondence and Letter Writing : Formal letters : characteristics and format, Types of business letters : Sales letter, Enquiry letter, Quotations, Complain and Adjustment letters, Applications, Resume : format and structure, E-mail etiquettes.

UNIT - IV :

Writing Skills : Precise writing, Noting and Drafting, Note making, Slogan writing, Precis, Advertising, Technical description of simple engineering objects and process, Application of linguistic ability : writing definitions of engineering terms, objects, process and principles.

UNIT - V :

Report Writing : Report – meaning and characteristics, classification of reports, format of report, various types of technical reports – progress report, lab report, observation report, survey report, project report, report of trouble**.**

References :-

1. Business Correspondence and Report Writing – Sharma, TMH.
2. Living English Structure – W.S. Allen, Longmans.
3. English Grammar – Ehrlich, Schaum series, TMH.
4. Soft Skills and Professional communication – Peter Francis, TMH (New Delhi)
5. New International Business English – Joans and Alexander (OUP).
6. Effective Technical Communication – Rizvi, TMH.
7. Professional Communication Skills – A.K. Jain, Dr. Pravin, S.R. Bhatia, Dr. A.M. Sheikh. S. Chand publication.

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July-2024

SUBJECT		Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title	L	T	P			
EN-1402	Language Lab	0	0	2	0 + 1	30	

Detailed Course Content :

1. Communication lab.
2. Listening Skills.
3. Speaking Skills
   (i) Phonetic symbols, pronunciation
   (ii) Conversation : Telephonic, face to face, formal and informal situations.
   (iii) Oral presentation
   (iv) Group discussion
   (v) Interview skills
4. Seminars.

Suggested Text/Reference Books/Softwares :-

1. Globerina software for language laboratory.
2. Clarity's tense buster software.
3. Spears language lab software.

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July-2024

SUBJECT		Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title	L	T	P			
MA-1401	Mathematics – I	3	1	0	4 + 0	70	22

UNIT - I :

Calculus : Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT - II :

Calculus : 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 : 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 Half range cosine, Parseval's theorem.

UNIT - IV :

Multivariable Calculus (Differentiation) : Limit, Continuity and Partial derivatives, Directional derivatives, Total derivative; Tangent plane and Normal line; Maxima, Minima and Saddle points; Method of Lagrange multipliers; Gradient, Curl and Divergence.

UNIT - V :

Matrices : Inverse and Rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, Skew-symmetric and Orthogonal matrices; Determinants; Eigen values and Eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Assessment Policy

Sr. No.	Particulars	Marks	Policy
1	Mid Semester Exam (MST)	20	At least two mid semester tests will be conducted of 20 marks each. The final Mid Semester Marks shall be the average of the two higher mid semester marks.
2	**Quizzes, Assignments, Tutorials and Regularity**		
(i)	Quizzes	04	Two quizzes will be conducted of 2 (two) marks each.
(ii)	Assignments	04	Two assignments will be conducted of 2 (two) marks each.
(iii)	Tutorials and Regularity	02	Every Thursday/Friday a tutorial sheet will be given to the students. Students have to submit, solution of these tutorial sheets on the next Monday. Marks for regularity will be awarded only if the student attend more than or equal to 75%.
3	End Semester Examination	70	Question Paper for end semester examination will have **05 (Five)** question, one question from each module (unit). Internal choices will be given.

References :-

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson Education.
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, Brooks/Cole, 2005.
6. R.K. Jain, S.R.K. Iyenger, Advanced Engineering Mathematics, Narosa Publications.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

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ME-1402	Engineering Graphics and CAD	2	0	4	2 + 2	70	22

UNIT - I :

Scales : Representative fractions, Plain scale, Diagonal scale, scale of chord.

Conic Sections : Construction of ellipse, parabola and hyperbola by different methods, normal and tangent.

UNIT - II :

Projection : Types of projection, orthographic projection, first angle and third angle projection, projection of points and lines, projection of lines inclined to both the planes, true inclinations and true length of straight lines, traces of straight lines.

Projection of Planes : Projection of planes inclined to both the planes.

UNIT - III :

Projection of Solids : Projection of polyhedrons (pyramids and prisms), and solids of revolution (cylinder and cone).

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

UNIT - IV :

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

Isometric Projections : Isometric view and projection from orthographic projections. Conversion of pictorial view into orthographic view.

UNIT - V :

Computer Aided Design (CAD) : Cartesian and polar coordinate system, absolute and relative coordinate system.

Basic Drawing Commands : line, point, rectangle, polygon, circle, arc, ellipse and polyline.

Basic E**diting Commands** : basic object selection method, erase, move, copy, offset, fillet, trim, chamfer and extrude command (Conversion of 2D to 3D solid modeling).

References :-

1. Engineering Drawing by N.D. Bhatt and V.M. Panchal; Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing and Graphics by Basant Agrawal and C.M. Agrawal; McGraw Hill.
3. Engineering Graphics by D.A. Hindoliya; B.S. Publications.
4. Engineering Drawing by P.S. Gill; S.K. Kataria and Sons.
5. Machine Drawing by N.D. Bhatt; Charotar Publishing House Pvt.
6. Engineering Drawing and Graphics by K. Venugopal; New Age International.

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