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			
CH-1402	Engineering Chemistry	3	1	2	4 + 1	70	22

***Course Objective** : An understanding of applications of chemistry in various fields of engineering is important. By this course the students are expected to learn the chemistry which is useful to enhance their engineering skills. The students can apply concepts of chemistry in various projects related with their works.*

UNIT - I :

WATER ANALYSIS & TREATMENT : Sources & impurities of water, Hardness of water & units of hardness, Determination of hardness by complexometry, Softening of water by Lime-Soda and Ion-exchange (De-mineralization) methods, Alkalinity and its determination, Boiler troubles (Scale and sludge, Priming & foaming, Boiler corrosion, Caustic embrittlement), Internal treatments of boiler feed water. Numerical problems based on above water softening process & water analysis. *(12 lecture)*

UNIT - II :

FUELS & COMBUSTION : Definition and classification of fuels, Calorific value and its type. Proximate and ultimate analysis of coal and their significances, Carbonization of coal. Knocking, Octane number and Cetane number, Introductory idea of cracking and its types. Numerical problems on combustion of fuels. *(8 lecture)*

UNIT - III :

LUBRICANTS & LUBRICATION : Introduction, functions and classification of lubricants, Mechanisms of lubrication, Significances and determinations of Viscosity & viscosity index, Flash and fire points, Cloud and pour points, Aniline point, Steam Emulsion Number, Acid Number, Saponification Number & Iodine value. *(6 lecture)*

UNIT - IV :

HIGH POLYMERS : Polymers, Degree of Polymerization, Classification of polymers, Thermo & Thermosetting Plastics with examples, Preparation, Properties & uses of PVC, PVA, Teflon, Nylon 6, Nylon 6:6, Polyester, Phenol-Formaldehyde, Urea-Formaldehyde, Buna-S and Buna-N. Bio-polymerization, Biodegradable polymers. Natural Rubber and Vulcanization of Rubber. *(8 lecture)*

UNIT - V :

CEMENT& CORROSION :

(a) **Cement:** Introduction, Average composition of cement, ISI specifications of Portland cement, Manufacturing of cement by wet process, Chemistry of Rotary kiln. Setting and hardening of cement.

(b) **Corrosion:** Types, Mechanisms of Chemical and Electrochemical corrosion. Galvanic corrosion, Pitting corrosion, Concentration cell corrosion, waterline corrosion, Stress corrosion, Prevention against corrosion. *(6 lecture)*

Contd. … 2

Course outcome : After completion of the course the students will have an understanding of Applied Chemistry required for their field and industrial works. Also, students will earn respective credits.

(i) They will be able to determine hardness and alkalinity of water.
(ii) They will have an understanding of fuels, their types and calorific values.
(iii) They will be able to do proper lubrication in various mechanical systems.
(iv) They will be able to prepare significant polymers for industrial applications.
(v) * They will have an understanding of cement and its manufacturing.
* They will be able to identify cause of corrosion of metals and will be able to do prevention against corrosion.

Evaluation : Evaluation will be continuous and integral part of the class works and external assessments.

References :-

1. Chemistry in Engineering & Technology, Vol-I & II, J.C. Kuriacose & J. Rajaram, Tata McGraw Hill India (P) Ltd., New Delhi.
2. A Text Book of Engineering Chemistry - S.S. Dara & S.S. Umre, S. Chand Publications, New Delhi.
3. Engineering Chemistry / Chemistry - Jain and Jain, Dhanpat Rai Publications, New Delhi.
4. Engineering Chemistry / Chemistry - Shashi Chawla , Dhanpat Rai Publications, New Delhi.
5. Engineering Chemistry - Subha Ramesh & Others, Wiley India Pvt. Ltd., New Delhi.
6. Chemistry of Engineering Materials, C.V. Agrawal, C.P. Murthy & A. Naidu, B.S. Publications, Hyderabad.
7. Engineering Chemistry - B.K. Sharma, Krishna Prakashan Media (P) Ltd, Meerut.
8. Essentials of Physical Chemistry, Arun Bahl, B.S. Bahl & G.D. Tuli; S. Chand & Co. Pvt. Ltd., Ram Nagar New Delhi.

Chemistry Practical's :-

Note : *About 10 of the following core experiments must be performed during the session.*

(1) Water Testing :

(i) Determination of Total hardness of water by EDTA titration method.
(ii) Determination of Alkalinity of water sample by Acid titration.
(iii) Chloride ion estimation in water by Argent metric titration.
(iv) Determine of pH of water.

(2) Fuels & Lubricant Testing :

(i) Flash & fire point determination by :-
(a) Pensky-Marten's Apparatus,
(b) Abel's Apparatus,
(c) Cleveland's open cupApparatus.

(ii) Viscosity determination by :-
(a) Redwood Viscometer No.1
(b) Redwood Viscometer No.2

(iii) Determination of moisture content in coal.

(3) Identification of functional groups of organic compounds / Determination of melting / boiling points of organic compounds.

(4) **Redoxtitrations :** Determination of percentage purity of Ferrous salt by redox titration using N-Phenyl Anthranilic acid as anindicator.

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			
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.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

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-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.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

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			
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.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

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			
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.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit