B. Tech First Year Syllabus (1st Semester)

1st Semester:

Sl. No.	Course Code	Course Name	Category	L-T-P	Credit
1	HUL 1101	Communicative English	DC	2-0-0	2
2	MAL 1101	Engineering Mathematics I	DC	3-1-0	4
3	CHL 1101	Engineering Chemistry	DC	3-0-0	3
4	EEL 1101	Basic Electrical Engineering	DC	3-0-0	3
5	MEL 1101	Engineering Mechanics	DC	3-0-0	3
Practical					
1	EEP 1101	Basic Electrical Engineering Laboratory	DC	0-0-3	1.5
2	CHP 1101	Engineering Chemistry Laboratory	DC	0-0-3	1.5
3	MEP 1101	Engineering Mechanics Laboratory	DC	0-0-3	1.5
4	HUP 1101	Language Laboratory	DC	0-0-2	1
5	OBE 1101	Outcome Based Education & Standarisation	DC	1-0-0	AUDIT
	TOTAL			15-1-11	**20.5**

Course Code	Course Name	LTPC
HUL1101	Communicative English	2 0 0 2

Objective: The present course aims at giving insight into social, political, economic and ideological process. It also provides the conceptual understanding of culture, society, civilization, Indian Constitution and Industrial Psychology, which will enable students to understand the various aspects of society and the environment human beings are living in. This paper is divided into six modules defining the meaning and utility of social sciences for engineers.

Course Outcome:

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

- Use the Listening, Speaking, Reading & Writing skills (LSRW) aptly which are essential to excel and be successful.
- Apply language in appropriate manner; as usage of language is very important according to time, place & space
- Write good CV & Résumé, business correspondence, Email & letters
- Apply learned soft skills, which will be helpful in their growth
- Analyse the various channels of communication within the organization
- Deal with various challenges in the organization
- Understand the various shades of life and dimensions of society by reading literature.

Language: Organs of Speech, Sounds, Pronunciation, Consonant, Long Vowels, Short Vowels, Syllable, Dipthongs. **Lectures: 04**

Comprehension: Reading and Writing, Précis, Essay & Paragraph Writing. **Lectures: 04**

Communication Skills: Communication Skills- Tips for conversation, Reading, Developing Reading Skills, Communication: Definition, types and Objective of Communication, Channels of Communication, Barriers of Communication, Group Discussion, Presentation Skills, Public Speaking. **Lectures: 08**

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Writing Skills: Business Correspondence, Applying for a job, Designing Curriculum Vitae, Résumé and Covering Letter, Letter Writing, Report writing, Notices, Email & E Correspondence. **Lectures: 06**

Literature: Selected Reading: **Lectures: 06**

Science Fiction: A Very Short Introduction by David Seed, Frankenstein by Marry Shelley, The Time Machine by H.G. Wells, Of Studies by Francis Bacon

Total Lectures: 28

Suggested Reading:

1. Ellis, Rod. *English for Engineers and Technologists: A Skills Approach. Book 1*.
2. Jones, Daniel. *An outline of English Phonetics*. New Delhi: Kalyani Publishers.
3. Hornby, A S. *Guide to Patterns and Usage in English*. OUP.
4. Nesfield, J. C. *Manual of English Grammar and Composition*. CUP.
5. Wells, H. G. *The Time Machine*.
6. Seed, David. *Science Fiction: A very Short Introduction. Oxford University Press*.
7. Shelley, Marry. *Frankenstein.* Maple Press.
8. Farhathulla, T. M. *Communication Skills for Technical Students*. Orient Blackswan, 2002.
9. Sharma R. C. and Krishna Mohan. *Business Correspondence & Report Writing*. Tata McGraw Hill, 2011.
10. Konar, Nira. *English Language Laboratories. A Comprehensive Manual* –, PH1 Learning Private Limited. New Delhi, 2011.
11. Bacon, Francis. *Selected Essays*.

MAL1101 ENGINEERING MATHEMATICS-I

1. Course Description:

Differential Calculus: Functions of single variable: Limit, continuity, and differentiability. Indeterminate forms. Mean value theorems: Rolle's theorem, Lagrange's theorem, Cauchy's theorem, Taylor's theorem with remainders. Curve tracing: Concavity, asymptotes, multiple points. Curvature: Intrinsic, Cartesian, and polar coordinate forms. (14 Hrs)
Integral Calculus: Riemann Integration, Fundamental theorem of Integral calculus, mean value theorem. Application of definite integrals to area, length, volumes, and surfaces of solids of revolution. Improper integrals: Beta and Gamma functions, differentiation under integral sign. (10 Hrs)
Infinite series: Sequences and series: Cauchy criterion, tests of convergence, absolute and conditional convergence, uniform convergence, power series, radius of convergence. (8 Hrs)

Matrices:
Rank of matrix, Echelon form, consistency, and solution of a system of linear equations, linear dependence and independence, linear and orthogonal transformations, Eigenvalues and eigenvectors, Cayley Hamilton theorem, reduction to diagonal form, Symmetric and skew symmetric matrices, Hermitian and skew Hermitian matrices, Quadratic forms. (10Hrs)

Textbooks:
1. E. Kreyszig: Advanced Engineering Mathematics, 8th ed., John Wiley & Sons, 2007.
2. G. B Thomas and R. L. Finney: Calculus and Analytic Geometry 9th ed., Addison Wesley Longman, Inc; 1998.
3. R. K. Jain and S.R.K. Iyengar: Advanced Engineering Mathematics, Narosa Publishers, 2002.
Reference Books:
1. R. G. Bartle, D. R. Sherbert: Introduction to Real Analysis, 3rd ed., 2007.
2. G. Strang: Introduction to Linear Algebra, 4th ed., Cengage Learning, 2006.
3. D. Poole: Linear Algebra; A Modern Introduction, Cengage Learning, 2010.

CHL 1101: Engineering Chemistry

UNIT - I

Chemical Thermodynamics: Second law of thermodynamics, entropy and its physical significance, entropy change of ideal gases, Gibbs and Helmholtz energy, thermodynamic properties for reversible and irreversible processes, equilibrium constant from thermodynamic considerations. **(Lecture: 10)**

UNIT - II

Electrochemistry: Behavior of strong electrolytes with concentration, electrochemical cells, EMF and its applications, commercially important cells and corrosion (its chemistry and remedial methods).

Chemical Kinetics: General discussion on the reactions of different orders including their rate laws with examples, problems based on first and second order reactions, pseudo-uniorder reactions, theories of reaction rates (collision and transition state theories), activation energy and catalytic reactions. Arrhenius equation and its significance. **(Lecture: 11)**

UNIT - III

Coordination Chemistry: Structure of coordination compounds corresponding to coordination no. up to 6, types of ligands, EAN, isomerism, bonding in coordination compounds, Application of organometallic chemistry and role of metal ions in biology. **(Lecture: 09)**

UNIT - IV

Organic Chemistry: Stereochemistry of carbon compounds, *E-Z* and *R-S* systems of nomenclature of organic molecules, conformation analysis for certain organic systems. *Spectroscopic methods:* UV-VIS, IR, NMR.

Polymers: Classification and structures of polymers, commercially important polymers: natural and synthetic rubber, plastic, biodegradable polymers and composite polymeric materials.

(Lecture: 12)

Textbooks:

1. Organic Chemistry by J. Clayden, Nick Greeves, S. Warren, Oxford Press, 2012.
2. Levine, *Physical Chemistry*, 5/e (7th reprint), Tata McGraw Hill, 2006.
3. Inorganic Chemistry, Principle, Structure and Reactivity, J.E. Huheey, E.A. Keitler, R.L. Keita, O.K. Medhi, Pearson Education, 4th Ed., 2006.
4. Chemistry, J.E. Mcmerry and R.C. Fay, 5th Ed., Pearson Education, 2008.
5. Solomons's Organic Chemistry, T.W.G. Solomons, C.B. Fryhle, S.A. Snyder, Wiley, 2017.
6. Stereochemistry of Carbon Compounds, E.L. Eliel, McGraw-Hill Inc., 1962.

Reference Books:

1. Shriver, Atkins and Langford, Inorganic Chemistry, 2/e, ELBS, 1994.
2. S.H. Pine, Organic Chemistry, 5/e (special Indian ed.), TMH, 2007.
3. Banwell and McCash, Fundamentals of Molecular Spectroscopy, 4/e, Tata Mc-Graw Hill, 1962.
4. Cotton, Wilkinson and Gaus, Basic Inorganic Chemistry, 3/e, John Wiley & Sons, Inc., 1996.
5. I.L. Finar, A Textbook of Organic Chemistry, 6/e, Vol. I & II, ELBS, 2006
6. Textbook of Polymer Science, F.W. Billmeyer, Wiley-India Publications, 1984.

EEL1101: BASIC ELECTRICAL ENGINEERING

Course Outcomes: Prerequisite: NA

- Describe KCL, KVL equation, nodal, mesh analysis and voltage method and explain different network theorems for solving different problems.
- Analyse AC circuits and Magnetic circuits.
- Describe three-phase balanced Supply & Power Measurement. Introduce different types of machines and some measuring instruments.
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1. **Introduction:** Introduction to electrical equipment, circuit components, Electrical Elements and their classification, KCL, KVL equation, nodal, mesh analysis, voltage method, D.C. circuits steady state analysis with independent and dependent sources, Series and parallel circuits, star-delta conversion, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer Theorem.

   LECTURES: 10

2. **A.C. circuits:** Common signals and their waveform, RMS and Average value, form factor and peak factor of a sinusoidal wave, Impedance of series and parallel circuits, Phasor diagram, Power, Power factor, Power Triangle, coupled circuits, Resonance and Q-factor.

   LECTURES: 7

3. **Magnetic circuits:** Introduction, Series & Parallel magnetic circuits, Analysis of Linear and non-linear magnetic circuits, Energy storage, A.C. excitation, Eddy current, and hysteresis losses. **LECTURES: 5**

4. **Three Phase Balanced Supply & Power Measurement:** Star-delta connection, Power measurement. **LECTURES: 2**

5. **Introduction of Electrical Machines:** Transformer, DC machines, Induction Machines.

   LECTURES: 7

6. **Introduction of Electrical Measurement:** MI & MC types meter, Energy meter, Wattmeter. **LECTURES: 5**

Text Book:

1. R.J. Smith and R.C. Dorf: Circuits, Devices, and Systems; John Wiley & Sons, 1992. 2. V. Del Toro: Electrical Engineering Fundamentals; PHI, 1994.
3. Van Valkenburg Network Analysis, Prentice Hall, India.

Reference Books:

1. Fundamentals of Electrical Engg. By Leonard S. Bobrow, Oxford.
2. Fundamentals of Electrical Engineering by R. Prasad, PHI Publication.
3. J. Nagrath and D. P. Kothari, 'Electric Machines', Tata McGraw Hill, 1985.

MEL 1101 Engineering Mechanics

1. Course Description:

Basic principles: Equivalent force system; Equations of equilibrium; Free body diagram; Reaction; Static indeterminacy. Structures: Difference between trusses, frames and beams, Assumptions followed in the analysis of structures; 2D truss; Method of joints; Method of section; Frame; Simple beam; types of loading and supports; Shear Force and bending Moment diagram in beams; Relation among load, shear force and bending moment. Friction: Dry friction; Description and applications of friction in wedges, thrust bearing (disk friction), belt, screw, journal bearing (Axle friction); Rolling resistance. Virtual work and Energy method: Virtual Displacement; Principle of virtual work; Applications of virtual work principle to machines; Mechanical efficiency; Work of a force/couple (springs etc.); Potential energy and equilibrium; Stability. Center of Gravity and Moment of Inertia: First and second moment of area; Radius of gyration; Parallel axis theorem; Product of inertia, Rotation of axes and principal moment of inertia; Moment of inertia of simple and composite bodies. Mass moment of inertia. Kinematics of Particles: Rectilinear motion; Curvilinear motion; Use of Cartesian, polar and spherical coordinate system; Relative and constrained motion; Space curvilinear motion. Kinetics of Particles: Force, mass and acceleration; Work and energy; Impulse and momentum; Impact problems; System of particles. Kinematics and Kinetics of Rigid Bodies: Translation; Fixed axis rotational; General plane motion; Coriolis acceleration; Work-energy; Power; Potential energy; Impulse-momentum andassociated conservation principles; Euler equations of motion and its application.

2. Broad Course Outline:

- Introduction
- Structure
- Truss and Frame
- Friction
- Virtual work and Energy
- COG and Moment of Inertia
- Kinematics of particle
- Kinetics of particle

3. Course Outcomes (COs):

On completion of the course, the students will be able to:

- Know about basics of mechanics
- Know about the mechanics of load distribution in truss and frame
- Understand friction and its application
- Understand the kinematics and kinetics of particle
- Understand the kinematics and kinetics of rigid bodies
- Understand work, energy and momentum

4. Books:

Text Books

- Engineering Mechanics - Static and Dynamic, R.C. Hibbeler, Pearson Publication.
- Engineering Mechanics - Static J.L. Meriam et.al. Wiley India Pvt. Ltd.

Reference Books

- Engineering Mechanics - Dynamic J.L. Meriam et.al. Wiley India Pvt. Ltd.

EEP1101: BASIC ELECTRICAL ENGINEERING LABORATORY

Course Outcomes:

- Realisation of KCL, KVL equations, and different network theorems.
- Determination of different parameters and phasor diagram of AC circuits.
- Energy Measurement using an energy meter.
- Study of characteristics of fluorescent lamp connection and carbon tungsten lamp

List of Experiments

1. Study of Network Theorems (KCL & KVL, Thevenin's, Norton's, Maximum Power Transfer Theorem).
2. Familiarisation with Voltmeter, Ammeter & Wattmeter
3. Study of RL & RLC circuit.
4. Study of the calibration of the Energy Meter.
5. Study of characteristic fluorescent lamp connection.
6. Study of the characteristics of a carbon tungsten lamp.
7. Study of RL, RC, and RLC series and parallel circuits.

Textbook:

1. R.J. Smith and R.C. Dorf: Circuits, Devices, and Systems; John Wiley & Sons, 1992.
2. V. Del Toro: Electrical Engineering Fundamentals; PHI, 1994.

CHP1101: ENGINEERING CHEMISTRY LABORATORY

Exp. No. 1: Determination of viscosity by Redwood viscometer.
Exp. No. 2: Determination of critical micelle concentration (cmc) of commercial soaps by surface tension/conductance method.
Exp. No. 3: Verification of Beer-Lambert's law and determination of concentration of unknown solution by spectrophotometer.
Exp. No. 4: To study the adsorption of acetic acid on activated charcoal.
Exp. No. 5: Determination of dissociation constant of weak acid using a pH meter.
Exp. No. 6: Determination of cloud point of polymers and the effect of additives.
Exp. No. 7: To determine the rate constant of acid catalyzed hydrolysis of methyl acetate conductometrically.
Exp. No. 8: To find the strength of unknown supplied acid by conductometric titration (strong acid vs. strong base).
Exp. No. 9: Estimation of hardness of water by complexometry.
Exp. No. 10: Synthesis and characterization of metal(acetylacetonate): Mn (III)/Fe (III).
Exp. No. 11: Estimation of Fe^{2+} by permanganometry.
Exp. No. 12: Preparation of drug molecule: Paracetamol/Aspirin.
Exp. No. 13: Isolation of natural products like Caffeine/Lactose.
Exp. No. 14: Preparation of nylon 6,6.
Exp. No. 15: Find out number of components in organic mixture and determination of R_f of each component using thin layer chromatography.
Exp. No. 16: Find out the m.p. of a binary mixture of organic compounds by varying the composition and determine the composition of the unknown mixture.

NOTE: Any ten experiments from the above shall be performed

Text/Reference Books:

1. Practical's in Physical Chemistry, P.S. Sindhu, Macmillan 2006.
2. Vogel's Textbook of Quantitative Inorganic Analysis, Including Elementary Instrumental Analysis, A.I. Vogel, 5th Edition, Addison-Wesley Longman, Incorporated, 1989.
3. Comprehensive Practical Organic Chemistry Preparation and Quantitative Analysis, V.K. Ahluwalia, Renu Aggarwal, University Press India LTD, 2000.
4. J.R. Mohrig, T.C. Morril, C.N. Hammond and D.C. Neckers, Experimental Organic Chemistry, W.H. Freeman and Co., 1998.
5. N.K. Vishnoi, Advanced Practical Organic Chemistry, Vikash Publishing Housing Pvt. LTD., 1996.
6. B.S. Furniss, A.J. Hannaford, P.W.G. Smith, and A.R. Tatchell, Vogels Textbooks of Practical Organic Chemistry, 5th Ed., ELBS Longman, 1994.

HUL1101 English Language Lab

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling independent language learning.
- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm.
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
- To improve the fluency of students in spoken English and neutralize their mother tongue influence.
- To train students to use language appropriately for public speaking and interviews.

Learning Outcomes: Students will be able to attain

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

List of practical

1. Self-Introduction
2. Basic Phrases
3. Story and Action: Dialogues & Narration
4. Conversational skills
5. Describing Objects
6. Expressing opinions
7. Showing agreement and disagreement
8. Extempore
9. JAM Sessions
10. Group Discussions
11. Debates
12. Interviews
13. Formal Presentation

14. Newspaper Reading and discussion of interesting Information

15. Role Play

16. Comprehension of audio material

17. Learning correct Pronunciation

The lab shall have two parts:

- **Computer Assisted Language Learning Lab**- it requires a spacious room equipped by English Language Learning software for students. The students will be guided and monitored by the instructor.

- **Interactive Communication Lab**- it requires a spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

OBE1101 Outcome-Based Education & Standardisation

Credit: 1 (Audit)

UNIT: I
Introduction to OBE **Lectures: 01**

UNIT: II
Instructional Design for active learning **Lectures: 02**

UNIT: III
Implementing OBE: PEO, PO, CO **Lectures: 05**

UNIT: IV
Assessments and Expectations in OBE **Lectures: 04**

UNIT: V
Roles of Teachers and Students **Lectures: 02**

Total Lectures: 14

Text Books:

1. Rao, V. V. *Outcome Based Education and Accreditation*. Notion Press, 2015.
2. Pannikot, Dhishna. B. C. Mohan. *Outcome Based Education Towards a Pedagogic Shift*, Authorspress, 2016.

*** Standardization part is missing**