



**MANIPAL INSTITUTE OF TECHNOLOGY**  
**MANIPAL**  
*(A constituent unit of MAHE, Manipal)*

**FIRST YEAR B. TECH CURRICULUM**  
**FIRST YEAR B. TECH: ABSTRACT SYLLABUS**

## **Contents**

First year B. Tech curriculum 2022 scheme: Physics cycle	<b>03</b>
First year B. Tech curriculum 2022 scheme: Chemistry cycle	<b>04</b>
Abstract syllabus: Physics cycle	<b>05</b>
Abstract syllabus: Chemistry cycle	<b>12</b>

**FIRST YEAR B Tech CURRICULUM 2022 (Common to all branches)**

**PHYSICS CYCLE/GROUP**

Year	FIRST SEMESTER						SECOND SEMESTER					
	Sub. Code	Subject Name	L	T	P	C	Sub. Code	Subject Name	L	T	P	C
I	MAT 1171	Engineering mathematics - I	3	1	0	4	MAT 1271	Engineering mathematics - II	3	1	0	4
	PHY 1071	Engineering Physics	3	0	0	3	CHM 1071	Engineering Chemistry	3	0	0	3
	CIE 1071	Mechanics of Solids	2	1	0	3	BIO 1071	Biology for Engineers	3	0	0	3
	ECE 1071	Basic Electronics	3	0	0	3	ELE 1071	Basic Electrical Technology	2	1	0	3
	MIE 1071	Basic Mechanical Engineering	3	0	0	3	CSE 1071	Problem Solving Using Computers	2	1	0	3
	HUM 1071	Communication Skills in English	1	0	2	2	CIE 1072	Environmental Studies	1	0	2	2
	IPE 1071	Universal Human Values and Professional Ethics (MLC)	1	0	0	1	HUM 1072	Human Rights and Constitution (MLC)	1	0	0	1
	PHY 1081	Engineering Physics Lab	0	0	3	1	CHM 1081	Engineering Chemistry Lab	0	0	3	1
	MIE 1081	Workshop Practice	0	0	3	1	CSE 1081	Problem Solving Using Computers Lab	0	0	3	1
	MIE 1181	Engineering Graphics - I	0	0	3	1	MIE 1281	Engineering Graphics - II	0	0	3	1
	IPE ****	Creativity, Problem Solving & Innovation* (MLC)	1	0	0	--*	IPE ****	Creativity, Problem Solving & Innovation* (MLC)	1	0	0	--*
		<b>17</b>	<b>2</b>	<b>11</b>	<b>22</b>			<b>16</b>	<b>3</b>	<b>11</b>	<b>22</b>	
	<b>Total Contact Hours (L + T + P)</b>	<b>30</b>				<b>Total Contact Hours (L + T + P)</b>	<b>30</b>					

\*After completing a project work along with other activities which are assessed periodically the students would earn 3 credits which would be considered in lieu of an open elective for Fifth Semester B Tech. **MLC** – Mandatory Learning Course

**FIRST YEAR B Tech CURRICULUM 2022 (Common to all branches)**

**CHEMISTRY CYCLE/GROUP**

Year	FIRST SEMESTER						SECOND SEMESTER					
	Sub. Code	Subject Name	L	T	P	C	Sub. Code	Subject Name	L	T	P	C
I	MAT 1171	Engineering mathematics - I	3	1	0	4	MAT 1271	Engineering mathematics - II	3	1	0	4
	CHM 1071	Engineering Chemistry	3	0	0	3	PHY 1071	Engineering Physics	3	0	0	3
	BIO 1071	Biology for Engineers	3	0	0	3	CIE 1071	Mechanics of Solids	2	1	0	3
	ELE 1071	Basic Electrical Technology	2	1	0	3	ECE 1071	Basic Electronics	3	0	0	3
	CSE 1071	Problem Solving Using Computers	2	1	0	3	MIE 1071	Basic Mechanical Engineering	3	0	0	3
	CIE 1072	Environmental Studies	1	0	2	2	HUM 1071	Communication Skills in English	1	0	2	2
	HUM 1072	Human Rights and Constitution (MLC)	1	0	0	1	IPE 1071	Universal Human Values and Professional Ethics (MLC)	1	0	0	1
	CHM 1081	Engineering Chemistry Lab	0	0	3	1	PHY 1081	Engineering Physics Lab	0	0	3	1
	CSE 1081	Problem Solving Using Computers Lab	0	0	3	1	MIE 1081	Workshop Practice	0	0	3	1
	MIE 1181	Engineering Graphics – I	0	0	3	1	MIE 1281	Engineering Graphics - II	0	0	3	1
	IPE ****	Creativity, Problem Solving & Innovation* (MLC)	1	0	0	--*	IPE ****	Creativity, Problem Solving & Innovation* (MLC)	1	0	0	--*
		<b>16</b>	<b>3</b>	<b>11</b>	<b>22</b>			<b>17</b>	<b>2</b>	<b>11</b>	<b>22</b>	
	<b>Total Contact Hours (L + T + P)</b>	<b>30</b>				<b>Total Contact Hours (L + T + P)</b>	<b>30</b>					

\*After completing a project work along with other activities which are assessed periodically the students would earn 3 credits which would be considered in lieu of the open elective for Fifth Semester B. Tech. **MLC** – Mandatory Learning Course

**MAT 1171****ENGINEERING MATHEMATICS – I****[3 1 0 4]**

Matrices: inverse and rank, solution of linear system of equations, eigen value problems. Vector spaces: basis, linear transformations, inner product spaces and orthogonalization. First and higher order differential equations and their solutions, Lagrange's and divided difference interpolation. Numerical differentiation and integration. Solution of algebraic and transcendental equations. Solutions of ordinary differential equations.

**Reference:**

1. B.S. Grewal, *Higher Engineering Mathematics*, 43<sup>rd</sup> edition, 2015, Khanna Publishers.
2. Kreyzig E, *Advanced Engineering Mathematics*, 9<sup>th</sup> edition, 2011, Wiley Eastern, Delhi.
3. David C. Lay, *Linear Algebra and applications*, 3<sup>rd</sup> edition, 2009, Pearson Education.
4. Sastry S.S - *Introductory methods of Numerical analysis*, 5<sup>th</sup> edn., PHI learning Pvt. Ltd, 2012.
5. Rainville E.D. and Bedient P.E., *A short course in differential equations*, 8<sup>th</sup> edition, 2011, Prentice Hall, New York.

**PHY 1071****ENGINEERING PHYSICS****[3 0 0 3]**

**Wave Optics:** Electromagnetic waves, Significance of Maxwell's equations, Overview of Interference, Interference from thin films, Newton's rings, Anti reflection coatings, Michelson interferometer, and applications, Overview of Diffraction, Diffraction gratings and applications, **Lasers:** Characteristics of Lasers, Einstein's coefficients He-Ne Laser, Ruby Laser, Semiconductor Laser, Applications of Laser, **Fibre optics:** Principle of optical fibre, Step-index and Graded index fibre, single mode and multi-mode fibres, attenuation and distortion in optical fibres, Applications of optical fibres. **Introduction to quantum physics:** Black body radiation and Planck's hypothesis, Overview of photoelectric effect, The Compton effect, Overview of wave properties of particles, Quantum particle, uncertainty principle. **Quantum mechanics:** An interpretation of quantum mechanics, particle in a box, boundary conditions on particles in general, the Schrodinger equation, Particle in a well of finite height, Tunnelling through a potential barrier and its applications, The simple harmonic oscillator, **Molecules and solids:** Overview of molecular bonds, Free electron theory of metals, Band theory of solids, Electrical conduction in metals, Insulators and Semiconductors, Semiconductor Devices, Superconductivity. **Introduction to nano**

**science:** Basic Principle of Nanoscience, Surface area to volume ratio, quantum confinement effects, Top-down and Bottom-Up approach, Applications.

**Reference:**

1. Jewett & Serway, PHYSICS for Scientists and Engineers with Modern Physics; 7<sup>TH</sup> edition, Cengage Learning.
2. S. Mani Naidu, Engineering Physics. PEARSON, Ed., 2014
3. Ajoy Ghatak and K. Thyagarajan, Introduction to Fiber Optics, 2010, Cambridge University Press.
4. Arthur Beiser, Shobhit Mahajan, S Rai Choudhary, Concepts of Modern Physics, 6<sup>th</sup> Edition, Mc. Graw Hill Company Ltd., New Delhi.
5. Introduction to Optics, Frank L. Pedrotti, S.J, and Leno S Pedrotti, Printice Hall, Inc. Ed., 1987

**CIE 1071**

**MECHANICS OF SOLIDS**

**[2 1 0 3]**

Introduction to engineering mechanics, Rigid body, Force and system of forces, Composition and Resolution of forces, Moment of forces, Varignon's theorem, Couple, Resultant of force system. Conditions of Equilibrium, Space diagram and Free body diagram, Lami's theorem, Equilibrium of concurrent and non-concurrent force systems, Friction. Centroid and Moment of Inertia of simple and composite areas.

Introduction to deformable bodies, Mechanical properties of materials, Stress, Strain, Hooke's law. Stress strain behaviour of ductile and brittle material, Factor of safety, Stresses and deformations in prismatic, stepped and tapered bars. Shear stress and strain, Poisson's ratio, Volumetric stress and strain, Elastic constants and their relationships. Stresses in thin cylinder, compound bars, Thermal stresses in compound bars. Concepts of bending moment and shear force diagrams.

**Reference:**

1. Meriam J. L., Kraige L. G., Engineering Mechanics: Statistics (5e), John wiley & sons, 2007.



Working of 2-stroke, 4 - stroke C.I and S.I Engines **Power Transmission:** Belt drives, Introduction to rope drive and chain drives, Gear Drives. **Machine Tools:** Introduction to Lathe, Drilling Machine and operations, **Casting and Forging:** Two box moulding procedure, moulding sand and its desirable properties, Pattern allowances, Introduction to forging. Welding: Principle of Resistance spot welding, Electric arc welding, TIG, MIG Welding and Oxy-acetylene gas welding, Introduction to soldering and brazing. **Automation:** Introduction to automation, CNC machines, basic programming, Robotics, robot configuration, application of robotics, principles of additive manufacturing.

**Reference:**

1. K. R.Gopalakrishna, Text book of elements of Mechanical Engineering, Subhash Publications, Bangalore, 2005.
2. Rajput R. K., Elements of Mechanical Engineering, Fire Wall Media, 2005.
3. B.S. Raghuvanshi, A course in Workshop Technology, Vol. 1, Dhanpat Rai & sons, New Delhi, 2005.
4. Groover Mikell P., Automation, Production systems, and Computer-Integrated Manufacturing. Pearson Education India, 2016.
5. HMT Limited, Mechatronics, Tata McGraw Hill Publishing Company Limited, New Delhi.

**HUM 1071**

**COMMUNICATION SKILLS IN ENGLISH**

**[1 0 2 2]**

**Reading-** selected texts on different themes, **genres and styles** – discussion on universal human values, professionalism and conflicts; **Writing** - response writing on themes related to human values , **academic writing** – essay; mechanics of writing–punctuation, functional grammar, and error identification; **Oral communication** – speech, presentation/Impromptu speeches, Group discussion, Interview techniques, formal/informal communication; **Listening**-Audio Texts/speeches, listening skills; **Communication**- in a group and interpersonal communication.

**Reference:**

1. Green, D. *Contemporary English Grammar Structure and Composition* (2nd ed.). Laxmi Publications, 2022
2. Swan, Michael *Practical English Usage*. Oxford University Press. London, 2014.

3. Markel, M., & Selber, S. A. *Technical Communication* (Thirteenth ed.). Bedford/St. Martin's, 2020
4. Talbot, F. *How to Write Effective Business English: Your Guide to Excellent Professional Communication* (3rd ed.). Kogan Page, 2019
5. Raman, M & Sharma S. *Technical Communication: Principles and Practice*. Oxford University Press. New Delhi, 2014

**IPE 1071 UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS [1 0 0 1]**

**UNIVERSAL HUMAN VALUES:** Need, Basic Guidelines, Content and Process for Value Education, Understanding Harmony in the Human Being or with oneself, Harmony in the Family and Society, Harmony in the Nature and Existence, Implications of the Holistic Understanding of Harmony on Professional Ethics.

**PROFESSIONAL ETHICS:** Moral issues and dilemmas, Models of professional roles, Theories about right action, Self-interest, Customs and Religion. Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisers, Moral Leadership, Code of Conduct, Corporate Social Responsibility.

**Reference:**

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff: The Impact of Overconsumption on the Planet, Our Communities, and Our Health-And How We Can Make It Better by Annie Leonard, Free Press; Reprint edition (22 February 2011)
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Economy of Permanence - J C Kumarappa
6. Rediscovering India - by Dharampal
7. Vivekananda - Romain Rolland (English)
8. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
9. Engineering Ethics by Harris, Pritchard, and Rabins, Cengage Learning, New Delhi.

10. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
11. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan, and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
12. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill – 2013

**PHY 1081**

**ENGINEERING PHYSICS LAB**

**[0 0 3 1]**

<b>Exp. No.</b>	<b>Title</b>
1	Newton's Rings
2	Energy Band Gap
3	Fermi Energy of Metal
4	Photoelectric Effect
5	Black Body Radiation
6	Hall Effect
7	Resistivity of Semiconductor by Four Probe Method
8	Numerical aperture and divergence angle of OFC
9	Determination of Boltzmann Constant
10	Wavelength of Laser using Diffraction Grating
11	Michelson's Interferometer (Demo)*
12	Refractive Indices of Uniaxial Crystals (Demo)*

**MIE 1081**

**WORKSHOP PRACTICE**

**[0 0 3 1]**

Mechanical Engineering Practices - Sheet metal, Plumbing exercises, Study of Automotive systems like Transmission and Suspension, Demonstration on the working of Lathe and Drilling machine, Civil Engineering Practices - Material Testing by conducting Tensile test, Shear test and

Compression test, Surveying exercises using chain and tape, Prismatic compass, Dumpy level, Electrical and Electronics Engineering Practices – Study of wiring tools, Fuses, Circuit breakers, Lighting sources, Wiring, Electrical energy in Single phase and three phase circuits, Energy tariff calculations. Testing of Electronic components, IC based experiments comprising Digital counter, Buzzer and Musical doorbell, Soldering practice, Building a DC regulated power supply.

**References:**

1. Hajra Choudhury S. K and Bose S. K, "Elements of Workshop Technology, Vol I", Media Promoters & Publishing Pvt. Ltd., Mumbai, 2012.
2. Raghuvanshi S.S, "Workshop Technology", Dhanpat Rai and Sons, Delhi, 2002.
3. Punmia B. C, "Surveying", Laxmi Publications, Bangalore, 2012
4. Uppal S.L., Electrical Wiring, Estimating and Costing, Khanna Publishers, 1978 5. Bishop Owen, Electronics: A First Course, (2e), NEWNES, An Imprint of Elsevier, 2006.

**MIE 1181**

**ENGINEERING GRAPHICS – I**

**[0 0 3 1]**

Geometric construction, Dimensioning, Orthographic projections, Projection of points, Projection of straight lines by rotating line method, Line inclined to one plane & inclined to both planes, Projection of regular plane surfaces by change of position method, Plane inclined to one plane & inclined to both planes, Projection of regular solids by change of position method, Solid inclined to one plane & inclined to both HP & VP.

**Reference:**

1. Gopalkrishna K. R. and Sudhir Gopalkrishna "A textbook of Computer Aided Engineering Drawing", 37th Edition, Subhas Stores, Bangalore, 2012.
2. Bhat N. D. and V.M. Panchal "Engineering Drawing", 50th Edition, Charotar Publishing House, Anand, India, 2010.
3. Venugopal K. "Engineering Drawing and Graphics + Auto CAD" Newage International Publishers, Delhi, 2002.
4. Narayana K. L. and Kannaiah P, "Text book on Engineering Drawing" Scitech Publications, Chennai, 2002.
5. Basant Agrawal & Agrawal C M "Engineering Drawing" Tata McGraw Hill, New Delhi, 2010.

Mean value theorems, Taylor and Maclaurin's series expansions, indeterminate forms. Partial differentiation, total derivatives, errors and expansions, Taylor's theorem, maxima and minima, Lagrange's method. Infinite series: tests for convergence of series with positive terms, alternating series, power series. Analytical solid geometry: spheres. Cones and cylinders. Multiple integrals and their applications, beta and gamma functions. Laplace transforms: periodic functions, step functions, inverse transforms, convolution, solution of differential equations and applications.

**Reference:**

1. B.S. Grewal - *Higher Engineering Mathematics*, , 43<sup>rd</sup> edition, 2015, Khanna Publishers.
2. N.Piskunov-*Differential Calculus*, Vol I and II, 1996, Mir Publications .
3. Rainville E.D and Bedient P.E , *A short course in differential equations*, 8<sup>th</sup> edition, 2011, Prentice hall, New York.
4. Kreyzig E, *Advanced Engineering Mathematics*, 8<sup>th</sup> edition, 2006, Wiley Eastern , Delhi.
5. Shanti Narayan - *Differential Calculus*, 6<sup>th</sup> edition, 2014, Shyam Lal Charitable Trust, Delhi

**Electrochemistry** - Electrochemical cells, Energetics of cell reaction, Single electrode potential, Nernst equation, EMF of cell, Calomel electrode, Glass electrode Battery Technology: Classification, requirements of primary and secondary batteries, Li-ion batteries –construction, working and applications, advantages and disadvantages. Fuel Cells – AFC & PEMFC, construction, working, advantages and disadvantages. Metal finishing: Electroplating – polarization, over voltage, decomposition potential, characteristics of good deposit, Factors influencing the nature of the deposit, methods of cleaning the metal surface. Electroplating of Cu & Cr & electroless plating of Cu. **Analytical methods** - Potentiometry, conductometry, Colorimetry, Beer-Lambert's law and its applications, Principles of flame photometry. **Corrosion and its Control** - Classification, Electrochemical theory with special reference to rusting of iron, Galvanic series, Factors affecting corrosion, brief account of galvanic, pitting, intergranular and stress corrosion, Corrosion control. **Water Technology** - Hardness of water, Boiler troubles- scale and sludge formation, priming and foaming, Internal treatment, Softening of water by Hot lime soda process, Desalination of brackish water. **Engineering Materials** - Polymers: classification,

Molecular weight, Correlation of polymer properties with structure Glass transition temperature  
**Liquid** crystals: Thermotropic and lyotropic, classification based on structure and phases, Liquid crystal Displays Composites: Classification and properties, Polymer-Matrix Composite. Thin films: Formation, PVD and CVD techniques, comparison and uses. Nanomaterials: Classification, bottom up and top down approach, advantages and disadvantages

**Reference:**

1. Jain P.C., Jain M. Engineering chemistry. 16th Edn., Dhanpat Rai and Sons, New Delhi, 2015.
2. Fischer T., Materials Science for Engineering Students, Academic Press, London, 2009

**BIO 1071**

**BIOLOGY FOR ENGINEERS**

**[3 0 0 3]**

**Bioinspiration:** Examples of bioinspiration models used in engineering. **Organization and Evolution of living systems:** Biological hierarchies, modularity and incremental change, how living systems improves by itself through evolution, Darwin's model, Concepts of evolution, adaptation. **Cooperation:** Symbiosis, co-evolution, communal benefit, predators and parasites. **Communications:** Neural and humoral, autonomic nervous system, action potentials. **Flow of information in living systems:** Mendelian model and its testing, Location of factors and its mode of inheritance, Morgan concept on location of factors, pedigree analysis. **Information storage and maintenance in living systems:** Discovery of DNA, Griffiths transformation experiment, Chargaff's rule, Meselson and Stahl experiment, Kornberg experiment, structure of DNA, DNA copying mechanism and its proof reading as well as editing, RNA synthesis and processing, Protein synthesis and Genetic code. **Building blocks of life:** Elements of life and their bonding ability, importance of carbon, elemental replacement, different types of bonds and interactions in biological systems, water and phospholipids as well as their importance in the survival of life, Macromolecules such as carbohydrates and proteins, their structures and enzymes. **Case studies:** Applications of biology in engineering and lessons to learn from nature, eg., solar energy, recycling, fit form into function, energy optimization, etc

**References**

1. Johnson AT, 2010. Biology for Engineers, CRC Press Inc., USA, ISBN 9781420077636

2. Sadava DE, Hillis DM, Heller HC and Hacker SD, 2017. Life the science of biology, 11<sup>th</sup> edition, Macmillan Learning, USA ISBN-10: 1-319-01016-4.

3. Urry LA, Cain ML, Wasserman SA, Minorsky PV and Reece JB, 2017. Campbell biology, 11<sup>th</sup> edition, Pearson ISBN-10: 0134093410

**ELE 1071**

**BASIC ELECTRICAL TECHNOLOGY**

**[2 1 0 3]**

**DC Circuits:** Electric circuit elements, source transformation, Network reduction techniques, star-delta transformation; Mesh current analysis, Node voltage analysis, Network Theorems - Thevenin's, Superposition, and Maximum Power Transfer Theorems. RL and RC transients.

**Magnetic Circuits:** MMF, flux, reluctance, the analogy with electric circuits, analysis of series, parallel magnetic circuits, Electromagnetism, Faraday's laws of electromagnetic induction, self and mutual inductance, coupled circuits. **Single-phase AC Circuits:** Average value and RMS value of sinusoidal and non-sinusoidal waveforms, Sinusoidal AC voltage generation, Phasor representation, Steady-state analysis of RL, RC, and RLC series, and parallel circuits with sinusoidal voltage, impedance diagram, admittance, conductance, susceptance. Power in AC circuits, active power, reactive power, and apparent power, power factor. Resonance: Series and parallel resonance. **Three-phase AC Circuits:** Generation of 3-phase sinusoidal voltages, phase sequence, star, and delta connections, line and phase voltage, analysis of three-phase circuit with star/delta connected balanced and unbalanced loads, power measurement, two-wattmeter method. **Electrical Power System Components (Self-study):** Overview of Electrical Power System, Power system components, Generation, Transmission, Distribution, Utilization of Electric Power. Energy measurements, Digital Energy Meter. Electrical Machines: Transformers, DC and AC motors - Principle of Operation, Types, Construction, & Applications.

**References:**

1. Kothari D. P. & Nagarath I. J., *Basic Electrical Engineering (4e)*, TMH, 2019.
2. Nagasarkar T. K. & Sukhija M. S., *Basic Electrical Engineering (3e)*, OUP, 2017
3. Hughes E., *Electrical and Electronic Technology (12e)*, Pearson, 2016
4. <https://nptel.ac.in/courses/108/105/108105053/>
5. <https://www.coursera.org/learn/electric-power-systems>

Introduction to computing, Importance of Problem solving using computers, Algorithms and Flow charts, Introduction to C language, Simple C programs, Syntax and Logical Errors in compilation, Object and executable code, Data concepts in C, Expressions, Input and output statements, Compound statements, Selection statements, IF, IF-ELSE, Nested IF-ELSE, ELSE-IF Ladder, Switch, WHILE, DO-WHILE and FOR constructs, Control structures, Operators in C, 1-D and 2-D arrays and strings, Searching and sorting, Multidimensional arrays and matrices, Modular programming and recursive functions, Structure and pointers, Defining structures and Array of Structures, Pointer arithmetic, Pointer to structures, Cyber security.

**Reference:**

1. Dromey.R. G, *How to solve it by computers*, Pearson Education, 2007.
2. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming language (2e)*, Pearson India, 2015.
3. Deital. P and Deitel. H. M, *C: How to program (9e)*, Pearson, 2022.
4. Balagurusamy.E, *Computing fundamentals and C programming (2e)*, MC GRAW HILL INDIA, 2017.

**Environment:** meaning, objectives, major environmental issues, Sustainable development, Environment as a global concern, Renewable and non-renewable resources – Resource consumption & conservation methods, availability of water resources, Forest, Land and Mineral resources, Energy – Different types of energy, Conventional sources & non-Conventional sources of energy, solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas, Fossil Fuels, Hydrogen as an alternative energy, **Ecosystem:** meaning, structure and functions, biotic and abiotic components, Tropic levels, Energy flow in an ecosystem, Biodiversity, and its conservation – in situ & ex situ, IUCN red list, Environmental Pollution - water, air, land, noise, solid waste, biomedical waste, nuclear pollution, marine pollution, **Environmental laws and legislations:** Related to general, air, water, biodiversity and forests, Pollution control Boards: Central & State - Roles and responsibilities, Environmental impact assessment (EIA), **Disaster**

**Management:** Meaning, classification of disasters, Disaster management phases – Disaster management cycle, Emergency response and recovery, Hazardous waste spills and dangers posed, Case studies on Environmental crisis and remedies in Indian scenario, Practical activities related Environmental awareness and its conservation.

**Reference:**

1. Mohan Kanda, Disaster Management in India evolution of institutional arrangements & operational strategies. (2017)
2. Y.Anjaneyulu, Introduction to Environmental science (2017).
3. R.K.Trivedy, Handbook of Environmental laws, acts, guidelines, compliances & standards, 3<sup>rd</sup> edition, 2<sup>nd</sup> volume. (2017)
4. Benny Joseph, Environmental Studies, Tata McGraw-Hill Publishing Company Ltd., New Delhi (2008).
5. *Student guide:* Environment Reader for Universities, based on UGC syllabus published by Centre for Science and Environment, (2017).

**HUM 1072**

**HUMAN RIGHTS AND CONSTITUTION**

**[1 0 0 1]**

**Human Rights Origin and development:** Origins and Evolution, classical period, contribution of Magna Carta, American Bill of Rights, the French Revolution declaration of rights, Equality and Fraternity Marxist Revolutions, Liberal Perspective: Locke, Rousseau, Thomas Paine, J. S. Mill, A. V Dicey. Non –violence and community rights in Ancient India, socio-religious reform movement, equality of rights in India, rights of the marginalised India. **Classification of human rights:** civil and political rights, social and economic rights, cultural and group specific rights. **Universal Declaration of Human Rights and fundamental rights of Indian constitution:** Human rights and duties in India: constitutional framework, Basic Features of the Constitution of India, Fundamental Rights. Human Rights organisations: International and National: Police and Human Rights, Judiciary and Human Rights, National and State Human Rights Commission & other grievance redressal mechanism. **Emerging areas in human rights:** Human Rights and Environment, Human Rights and Globalization, Rights of the Women, Rights of the Children, Rights of the Dalit and Tribes, Rights of Minorities, Rights of Old and Disabled, Rights of unorganized Labour & Displaced Persons. **Human right violation episodes:** International- war,

terrorism, racial discrimination, gender violence, genocide; National- poverty, illiteracy, gender discrimination, caste and communal violence. **Remedial measures:** civil rights protection act, consumer right protection act, right to information act, domestic violence prevention act, environment protection act. **Ethical dimension:** value education and human rights.

**Reference:**

1. Halder, D., & Brahmhatt, S. S. (2021). *Advancement of Human Rights in India: Contemporary and Emerging Challenges*. SAGE Publications Pvt. Ltd.
2. Ishay, M. R. (2008). *The History of Human Rights: From Ancient Times to the Globalization Era*. University of California Press.
3. Juss, S. (2021). *Human Rights in India (Routledge Research in Human Rights Law)*. Routledge.
4. Mahoney, J. (2007). *The Challenge of Human Rights: Origin, Development and Significance*. Wiley-Blackwell.
5. Mishra, K. (2022). *Human Rights in India: Historical Social and Political Perspective*. Raj Publication.

**CHM 1081**

**ENGINEERING CHEMISTRY LABORATORY**

**[0 0 3 1]**

1. Alkalimetric titration
2. Total hardness of water
3. Estimation of percentage of copper in brass
4. Estimation of weight of iron in haematite
5. Estimation of percentage of manganese dioxide in pyrolusite
6. Estimation of ammonia nitrogen in a fertilizer
7. pKa value of a weak acid by potentiometric titration
8. Conductometric acid – base titration
9. Determination of concentration of copper using colorimeter
10. Determination of coefficient of viscosity of liquid
11. Determination of Chemical Oxygen Demand of water (demonstration)
12. Estimation of sodium by flame photometry (demonstration)

**Reference:**

1. Laboratory Manual for Engineering Chemistry Laboratory, M.I.T., 2014.
2. Vogel A.I. Text book of Quantitative Inorganic Analysis, 5th Edition, ELBS, 1998

**CSE 1081                      PROBLEM SOLVING USING COMPUTERS LAB                      [0 0 3 1]**

Introduction to computing, Simple C programming, branching control structures, Looping control structures, 1D and 2D array programming, Strings programming, Modular & recursive functions programming – Programs with pointers, structures – MATLAB programming with Simulink

**Reference:**

1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming language (2e)*, Pearson Education, 2015.
2. Deital.P. J and Deitel.H.M, *C: How to program (7e)*, Pearson Education, 2010.
3. Balagurusamy.E, *Computing fundamentals and C programming (1e)*, MC GRAW HILL INDIA, 2017.
4. Delores Etter, *Introduction to MATLAB*, Pearson Education India, 2019.
5. Stormy Attaway, *Matlab: A practical Introduction to Programming and Problem Solving (4e)*, Butterworth-Heinemann, Elsevier, 2017.

**MIE 1281    ENGINEERING GRAPHICS – II    [0 0 3 1]**

Section of solids, Sectioning by horizontal, vertical & inclined section planes, solids resting on HP or VP, inclined to one plane, Sectional views and true shape of section, Parallel line development, Radial line development, Development of tray, Isometric projection of simple cut solids, Combined solids, and machine components, Isometric to orthographic conversion, Simple and cut solids, Combined solids and simple machine components.

**Reference:**

1. Gopalkrishna K. R. and Sudhir Gopalkrishna "A textbook of Computer Aided Engineering Drawing", 37th Edition, Subhas Stores, Bangalore, 2012.
2. Bhat N. D. and V.M. Panchal "Engineering Drawing", 50th Edition, Charotar Publishing House, Anand, India, 2010.
3. Venugopal K. "Engineering Drawing and Graphics + Auto CAD" Newage International Publishers, Delhi, 2002.

4. Narayana K. L. and Kannaiah P, "Text book on Engineering Drawing" Scitech Publications, Chennai, 2002.
5. Basant Agrawal & Agrawal C M "Engineering Drawing" Tata McGraw Hill, New Delhi, 2010.