HIMACHAL PRADESH TECHNICAL UNIVERSITY
HAMIRPUR

Syllabus

for

B.Tech. First Year

(Common to all Branches)

As per National Education Policy (NEP-2020)

(w.e.f. the Academic Year 2023-2024)

Dean -Academic
H.P. Technical University
Hamirpur - 177 001, HP

S. No.	Group	Branches
1	Group-A	Civil Engineering Computer Science and Engineering Computer Science and Engineering (AI-ML) Computer Science and Engineering (AI-DS) Information and Technology Electronics and Communication Engineering.
2	Group-B	Electrical Engineering Electrical and Electronics Engineering Mechanical Engineering Textile Engineering

Dean -Academic
H.P. Technical University
Hamirpur - 177 001, HP

Group A: Semester I

Sr. No.	Category	Subject Code	Subject	L	T	P/D	Credits	Evaluation Scheme (Marks)		
								IA	ESE	Subject Total
Theory:										
1	FC	PHY-111	Applied Physics	3	1	0	4	40	60	100
2	FC	HS-111	Communication Skills	3	0	0	3	40	60	100
3	FC	EE-111	Basic Electrical Engineering	3	1	0	4	40	60	100
4	FC	MA-111	Applied Mathematics-1	3	1	0	4	40	60	100
5	MC	EVS-111	Energy and Environment	2	1	0	3	40	60	100
	Labs:							**IA**	**ESVE**	**Sub. Total**
1	FC	PHY-111P	Applied Physics Lab	0	0	2	1	30	20	50
2	FC	HS-111P	Communication Skills Lab	0	0	2	1	30	20	50
3	FC	EE-111P	Basic Electrical Engineering Lab	0	0	2	1	30	20	50
4	FC	*WXX-111P	Workshop	0	0	4	2	30	20	50
			Total	**14**	**04**	**10**	**23**			**700**

Group A: Semester II

Sr. No.	Category	Subject Code	Subject	L	T	P/D	Credits	Evaluation Scheme (Marks)		
								IA	ESE	Subject Total
Theory:										
1	FC	CHM-111	Applied Chemistry	3	1	0	4	40	60	100
2	FC	CS-111	Computer Programming	3	0	0	3	40	60	100
3	FC	EC-111	Basic Electronics Engineering	3	1	0	4	40	60	100
4	FC	MA-121	Applied Mathematics-II	3	1	0	4	40	60	100
5	MC	UHV-111	Universal Human Values and Awareness About Himachal Pradesh	3	0	0	3	40	60	100
	Labs:							**IA**	**ESVE**	**Sub. Total**
1	FC	CHM-111P	Applied Chemistry Lab	0	0	2	1	30	20	50
2	FC	CS-111P	Computer Programming Lab	0	0	2	1	30	20	50
3	FC	EC-111P	Basic Electronics Engineering Lab	0	0	2	1	30	20	50
4	FC	ME-111P	Engineering Graphics and Design	0	0	4	2	30	20	50
5	MC	HS-122P	Holistic Health and Yoga	0	0	2	1	30	20	50
			Total	15	03	12	**24**			750

Legends:

L - Lecture
T - Tutorial
P - Practical
CT - Class Test
IA - Internal Assessment
FC- Foundation Course
ESE - End Semester Examination
FW - Documentation/ File work and presentation
LP - Lab performance
ESVE - End Semester Exam. / Viva-voce Exam.
MC-Mandatory Course

*WXX where XX is branch code- CE (Civil Engineering), CS (Computer Science & Engineering), IT (Information & Technology), EC (Elect. Comm. & Engineering)

Dean -Academic
H.P. Technical University
Hamirpur - 177 001, HP

Group B: Semester I

Sr. No.	Category	Subject Code	Subject	L	T	P/D	Credits	Evaluation Scheme (Marks)		
								IA	ESE	Subject Total
Theory:										
1	FC	CHM-111	Applied Chemistry	3	1	0	4	40	60	100
2	FC	CS-111	Computer Programming	3	0	0	3	40	60	100
3	FC	EC-111	Basic Electronics Engineering	3	1	0	4	40	60	100
4	FC	MA-111	Applied Mathematics-1	3	1	0	4	40	60	100
5	MC	UHV-111	Universal Human Values and Awareness about Himachal Pradesh	3	0	0	3	40	60	100
	Labs:							**IA**	**ESVE**	**Sub. Total**
1	FC	CHM-111P	Applied Chemistry Lab	0	0	2	1	30	20	50
2	FC	CS-111P	Computer Programming Lab	0	0	2	1	30	20	50
3	FC	EC-111P	Basic Electronics Engineering Lab	0	0	2	1	30	20	50
4	FC	ME-111P	Engineering Graphics and Design	0	0	4	2	30	20	50
			Total	15	03	10	**23**			700

Group B: Semester II

Sr. No.	Category	Subject Code	Subject	L	T	P/D	Credits	Evaluation Scheme (Marks)		
								IA	ESE	Subject Total
Theory:										
1	FC	PHY-111	Applied Physics	3	1	0	4	40	60	100
2	FC	HS-111	Communication Skills	3	0	0	3	40	60	100
3	FC	EE-111	Basic Electrical Engineering	3	1	0	4	40	60	100
4	FC	MA-121	Applied Mathematics-II	3	1	0	4	40	60	100
5	MC	EVS-111	Energy and Environmental	2	1	0	3	40	60	100
Labs:										
1	FC	PHY-111P	Applied Physics Lab	0	0	2	1	30	20	50
2	FC	HS-111P	Communication Skills Lab	0	0	2	1	30	20	50
3	FC	EE-111P	Basic Electrical Engineering Lab	0	0	2	1	30	20	50
4	MC	HS-122P	Holistic Health and Yoga	0	0	2	1	30	20	50
5	FC	*WXX-111P	Workshop	0	0	4	2	30	20	50
			Total	14	04	12	**24**			750

Legends:

L - Lecture
T - Tutorial
P - Practical
CT - Class Test
IA - Internal Assessment
FC- Foundation Course
ESE - End Semester Examination
FW - Documentation/ File work and presentation
LP - Lab performance
ESVE - End Semester Exam. / Viva-voce Exam.
MC-Mandatory Course

***** WXX where XX is branch code- EE (Electrical Engineering.), EEE (Electrical & Electronics Engineering.), ME (Mechanical Engineering). TE (Textile Engineering.)

Template for-Internal Assessment (IA Theory)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

Award Sheet Theory Internal Assessment (IA)

Name of the Institution:			**Distribution of Marks**				
Programme:			**Periodical Examinations**		**Teacher Assessment** (Assignment discussion/ presentation/Quizzes/ Overall behavior)	**Attendance**	**Total Marks**
Subject:		**Sub. Code:**					
Branch:		**Semester:**	1st Periodical Examination	2nd Periodical Examination			
Max. Marks:		**Min. Marks:**					
Sr. No.	**University Roll No.**	**Name of Student**	**10**	**10**	**15**	**05**	**40**

Name of Internal Examiner

Signature……..……

Date……..……..…...

Head of Dept.

Signature…….....

Date……..

Note: The marks of the attendance (theory and practical) in Internal Assessment(IA) should be awarded on the basis of percentage of lectures attended as per the following details:

Sr. No	Percentage of Lecture Attended	Marks Awarded
1	From 75% to 79.9%	01
2	From 80% to 84.9%	02
3	From 85% to 89.9%	03
4	From 90% to 94.9%	04
5	Above 95%	05

Template for-Internal Assessment (Practical/Project/Seminar/Viva-Voce)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

Award Sheet Practical Internal Assessment (IA)

(Practical/Project/Seminar/Workshop)

Name of the Institution:			**Distribution of Marks**				
Programme:			**Written/ Presentation/ Demonstration**	**Viva-voce**	**Teacher Assessment: Lab Work performance/ Report/ File Work**	**Attendance**	**Total Marks**
Subject:		**Sub. Code:**					
Branch:		**Semester:**					
Max. Marks:		**Min. Marks:**					
Sr. No.	**University Roll No.**	**Name of Student**	**05**	**05**	**15**	**05**	**30**

Name of Internal Examiner

Signature……..……

Date……..……..…...

Head of Dept.

Signature…….....

Date……..

Template for-External Assessment (Practical/Project/Seminar/Viva-Voce)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET PRACTICAL (EXTERNAL ASSESSMENT)

(Practical/Project/Seminar/Workshop)

Name of the Institute: ……

Programme: ……

Subject Name: ……... …… **Subject Code:** ……..

Branch: ……... ……. **Semester** ……

Max Marks …….. **Min. Marks:** …….

Sr. No.	**University Roll No.**	**Name of Student**	**Marks in Figure**	**Marks in Words**

Name of Internal Examiner: ……

Signature……..……

Date……..……

Name of External Examiner…….

Signature…….....

Date……..……

Note: The distribution of marks would be on the basis of Task performance/written (10 marks) and viva-voce (10 marks), total=20 marks.

Syllabus

for

Semester-I (Group A&B)

and

Semester-II (Group-A&B)

PHY-111 Applied Physics							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester	Total	
3	1	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have 2 questions of 12 marks each and section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will cover the whole syllabus.

Course Contents:

Unit-I:
Theory of Relativity: Inertial and non- inertial frames of reference, earth as an inertial frame of reference, Michelson and Morley experiment, Postulates of special theory of relativity, Galilean and Lorentz transformations, Time dilation and length contraction, Relativistic kinematics and mass-energy equivalence. **Laser:** Introduction, Characteristics of lasers, Spontaneous and stimulated emission of radiation Einstein's coefficients, Population inversion, Ruby laser, Helium -Neon lasers & Semiconductor Lasers Applications of laser in industry, Scientific and medical fields.
Unit–II:
Oscillations: Simple harmonic motion (SHM), Differential equation of SHM, Energy of SHM, Damped and Forced Oscillations, Relaxation Time, Quality Factor, Resonance, Sharpness of Resonance. **Fiber Optics:** Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and acceptance cone, Numerical aperture, Propagation Mechanism and communication in fiber, Single and Multi-Mode Fibers, Step index and Graded index fiber, Attenuation and losses, Applications of optical fibers.
Unit–III
Quantum Mechanics: De Broglie waves, Phase and Group velocity concept, Uncertainty principle and its applications, Wave function, Postulates of quantum mechanics, Derivation of Schrodinger equation for time independent and time dependent cases and its applications viz. Particle in one dimensional box. **X-rays:** X-rays production, hard and soft x-rays, Continuous and characteristics x-rays, Bremsstrahlung effect
Unit-IV:
Electrodynamics: Equation of continuity, displacement current, Maxwell's equations, wave equation for electromagnetic radiation, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector & Poynting theorem. **Superconductivity:** Introduction and discovery of superconductivity, Meissner effect, Type-I and type-IIP superconductors, Isotope effect, BCS theory (qualitative), High temperature superconductors, Applications of superconductivity.

Textbooks:

- Engineering Physics, H.K Malik & A.K Singh, Tata McGraw-Hill.
- Ajoy Ghatak, Quantum Mechanics: Theory and Applications‖, Tata McGraw-Hill.
- Satya Prakash and Vibhav saluja, Engineering Physics‖, Pragti Prakashan Meerut.
- Applied Solid State Physics‖, Wiley India Pvt Ltd.

Reference Books:

- Ajoy Ghatak, ―Optics‖, Tata McGraw-Hill.
- N. Subrahmanyam, Brij Lal, M.N. Avadhanulu, ―Optics‖, S. Chand & Co. Ltd.
- Anuradha De, ―Fiber optics and laser Principles and Applications‖, New Age International.
- Arthur Beiser, ―Concepts of Modern Physics‖, Tata McGraw-Hill.
- David J Griffiths, ―Introduction to electrodynamics‖, Prentice Hall of India, New Delhi

HS-111 Communication Skills							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester	Total	
3	0	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have 2 questions of 12 marks each and section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will cover the whole syllabus.

Course Contents:

Unit-I:
Essentials of communication: The meaning, types &process of communication, Barriers to communication and removal of these barriers, Shannon & weaver model of communication, Berlos' model of communication, The Seven Cs of Effective Communication - Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness, Types of information- order, advise, suggestion, motivation, persuasion, warning and education. Mass Communication –function of mass communication – Media of mass communication, Advantages and disadvantages ofsocial media.
Unit–II:
Essentials of Grammar: Types of sentences: Declarative Sentence, Imperative Sentence, Interrogative Sentence, Exclamatory Sentence, simple, compound & complex sentences, conversion of one type of sentence into other, Parts of speech, Tenses, articles and prepositions, Model Auxiliaries Types of diction, ways to improve diction, Paragraph writing.
Unit–III
Technical Communication: Report writing: Characteristics of a good report, parts & types of reports, drafting of reports. Business letters: planning a business letter, parts of a letter, classification of business letters – inviting and sending quotations, letter placing orders, letter of complaint, letter of adjustment, and letter of Job, letter negotiating a job offer and Resume writing, Drafting memorandum, notices, agenda and minutes of meeting, preparing effective e- mail messages and power-point presentations
Unit-IV:
Soft skills & personality development: Soft skills: Classification of soft skills, Delivering effective presentations,Capturing audience, Impromptu speech, speech initiators, telephone etiquette - Good practice when making and receiving a call; Becoming a good leader and team-player, Personal SWOT analysis., body language, Types of interviews, preparing for a job interview, Strategies for managing emotions & controlling Stress.

Textbooks:

- Communication Skills, Sanjay Kumar and Pushp Lata, Oxford University Press.
- Effective Communication and soft Skills, Nitin Bhatnagar and Mamta Bhatnagar, Pearson Publication.
- Communicative English for Engineers and professionals, Nitin Bhatnagar and Mamta Bhatnagar, Pearson Publication.
- Personality and Soft Skills by B. K. Mitra Oxford press.
- An Introduction to Professional English and Soft Skills: by Bikram K. Das, Kalyani Samantray, Cambridge Press.
- Business correspondence and Report Writing: by R. C. Sharma & Krishna Mohan

Reference Books:

- Business Communication: Theory and Application by R.W. Lesikar and John.D. Pettit , All India Traveller Bookseller.
- Speaking and Writing for Effective Business Communication by Francis Soundaraj Macmillan.
- Understanding Human Communication by Ronald B. Adler and George Rodman Oxford University

Press: New York.

- Communication Skills and soft skills- An integrated approach, Kumar, Pearson Publication
- K.K.Sinha, Business Communication, Galgotia Publishing Company, New Delhi, 1999.
- R.K.Bansal& J.B. Harrison, spoken English for India, Orient Longman.
- An Introduction to Linguistics: Language, Grammar and Semantics by Pushpinder Syal and D. V. Jindal (Author) Paperback
- Mastering Interviews and Group Discussions by Dinesh Mathur CBS
- English Conversation Practice by Grant Taylor
- Handbook of Practical Communication Skill by Chrissie Wright (Ed.) JAICO Books.
- English Conversation Practice by Grant Taylor
- Business correspondence and Report Writing: by R. C. Sharma & Krishna Mohan

EE-111 Basic Electrical Engineering							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
3	1	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have 2 questions of 12 marks each and section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will cover the whole syllabus.

Course Contents:

Unit-I:
DC Circuits: Kirchhoff‘s voltage and current laws; power dissipation; Voltage source and current source; Mesh and Nodal analysis; Star-delta transformation; Superposition theorem. Thevenin‘s theorem; Norton‘s theorem; Maximum power transfer theorem; Millman‘s theorem and Reciprocity theorem; Transient response of series RL and RC circuits.
Unit–II:
Steady state analysis of DC Circuits: The ideal capacitor, permittivity; the multi- plate capacitor, variable capacitor; capacitor charging and discharging, current-voltage relationship, time-constant, rise-time, fall-time,inductor energization and de- energization, inductance current-voltage relationship, time-constant; Transient responseof RL, RC and RLC Circuits.
Unit–III
AC Circuits: Sinusoidal sources, RC, RL and RLC circuits, Concept of Phasors, Phasor representation of circuit elements, Complex notation representation, Single phase AC Series and parallel circuits, power dissipation in AC circuits, power factor correction, Resonance in series and parallel circuits, Balanced and unbalanced 3-phase circuit - voltage, current and power relations, 3-phase power measurement, Comparison of single phase and three phase supply systems. **Electromagnetism:** Electromagnetic induction, Dot convention, Equivalent inductance, Analysis of Magnetic circuits, AC excitation of magnetic circuit, Iron Losses, Fringing and stacking, applications: solenoids and relays.
Unit-IV:
Single Phase Transformers: Constructional features of transformer, operating principle and applications, equivalent circuit, phasor analysis and calculation of performance indices. **Motors and Generators:** DC motor operating principle, construction, energy transfer, speed torque relationship, conversion efficiency, applications, DC generator operating principle, reversal of energy transfer, EMF and speedrelationship, applications.

Textbooks:

- Ashfaq Husain and Harroon Ashfaq Fundamental of Electrical Engineering Dhanpat Rai & Co. (P) Limited; Fourth edition, 1 January 2016
- Nagrath I.J. and D. P. Kothari (2001), Basic Electrical Engineering, Tata McGraw Hill.
- Hayt and Kimberly, Engineering Circuit Analysis, Tata McGraw Hill.
- Ritu Sahdev (2019), Basic Electrical Engineering, Khanna Book Publishing Company
- Kulshreshtha D.C. (2009), Basic Electrical Engineering, Tata McGraw Hill.
- Rajendra Prasad (2009), Fundamentals of Electrical Engineering, Prentice Hall, India

Reference Books:

- Ajoy Ghatak, ―Optics‖, Tata McGraw-Hill.
- N. Subrahmanyam, Brij Lal, M.N. Avadhanulu, ―Optics‖, S. Chand & Co. Ltd.
- Anuradha De, ―Fiber optics and laser Principles and Applications‖, New Age International.
- Arthur Beiser, ―Concepts of Modern Physics‖, Tata McGraw-Hill.
- David J Griffiths, ―Introduction to electrodynamics‖, Prentice Hall of India, New Delhi

MA-111 Applied Mathematics-I							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
3	1	0	4	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have 2 questions of 12 marks each and section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will cover the whole syllabus.

Course Contents:

Unit-I:
Sequences and Series: Introduction to sequences and Infinite series, Tests for convergence/divergence, Limit comparison test, Ratio test, Root test, Cauchy integral test, Alternating series, Absolute convergence and conditional convergence. **Series Expansions:** Power series, Taylor & Maclaurin's series, Convergence of Taylor series, Taylor & Maclaurin's Theorem, Error estimates (one variable)
Unit–II:
Calculus: Rolle's theorem, Lagrange's and Cauchy mean value theorem, Application of definite integral to evaluate areas of bounded region, Arc length of a plane curve, volume of solids, surface areas of a solid revolution (Cartesian coordinates), Improper integrals, Beta and Gamma functions
Unit–III
Partial Differentiation and applications: Functions of several variables, Limits and continuity ($\delta - \epsilon$ approach), Partial derivatives, Euler's theorem (Homogeneous functions), Chain rule, change of variables, Jacobian, Maxima and minima by using second order derivatives, Lagrange's method of multipliers, Taylor's & Maclaurin's Theorem, Error estimation.
Unit-IV:
Multiple Integrals and applications: Double integral, change of order of integration in double integral, Polar coordinates, graphing of polar curves, Change of variables (Cartesian to polar), Applications of double integrals to areas and volumes, evaluation of triple integral.

Textbooks:

- B. S. Grewal, Higher Engineering Mathematics by B. S. Grewal 43rd Edition (2015)
- N. P. Bali and Manish Goyal A Textbook Of Engineering Mathematics (2016)
- Thomas, G.B. and Finney, R.L., Calculus and Analytic Geometry, Pearson Education (2007),9thed.
- Stewart James, Essential Calculus; Thomson Publishers (2007), 6th ed.
- R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics (2003), 2nd ed.

Reference Books:

- Wider David V, Advanced Calculus: Early Transcendentals, Cengage Learning (2007).
- Apostol Tom M, Calculus, Vol I and II, John Wiley (2003).
- Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons (2011) 9th Edition

EVS-111 Energy and Environment							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
2	1	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines for setting Question Paper: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have 2 questions of 12 marks each and section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will cover the whole syllabus.

Course Contents:

Unit-I:
Ecosystems: Structure and function of an ecosystem–ecological succession–primary and secondary succession - ecological pyramids – pyramid of number, pyramid of energy and pyramid of biomass. **Conventions on Climate Change:** Origin of Conference of Parties (COPs), United Nations Framework Convention on Climate Change (UNFCCC) and Intergovernmental Panel on Climate Change (IPCC); Kyoto Protocol, Montreal Action Plan; Paris Agreement and post-Paris scenario. **Environmental issues:** Global Environmental crisis, Current global environment issues, Global Warming, Greenhouse Effect, role of Carbon Dioxide and Methane, Ozone Problem, CFC_s and Alternatives, Causes of Climate change, Carbon footprint.
Unit–II:
Air Pollution: Origin, sources, adverse effects and preventive measures related to air pollution. Case study for air pollution (London smog, Photochemical smog, Bhopal gas tragedy). **Water Pollution:** Origin, sources, adverse effects and preventive measures related to water pollution. Case study forair pollution (Minamata tragedy, Arsenic pollution at Punjab/UP, The Ganga River pollution). **Noise Pollution:** Origin, sources, adverse effects and preventive measures related to noise pollution. **Nuclear pollution:** Origin, sources, adverse effects and preventive measures related to radioactive pollution, Case study. **Environmental protection acts:** Important environmental protection acts in India – water, air (prevention and controlof pollution) act, wild life conservation and forest act.
Unit–III
Renewable and non-renewable resources: Coal, Petroleum, Solar energy, wind energy, hydrothermal energy, nuclear energy, Tidal energy, Bioenergy etc. Role of individual in conservation of natural resources for sustainable life styles. Use and over exploitation of Forest resources, Deforestation, Timber extraction, Mining, Dams and their effects on forest and tribal people. Use and over exploitation of surface and ground water resources, Floods, Drought, Conflicts over water, Dams- benefits and problems. National green hydrogen mission. FAME India Scheme.
Unit-IV:
Environment and Disaster: Introduction: Principles of Disaster Management. Natural Disasters such as Earthquake, Floods, Fire, Landslides, Tornado, Cyclones, Tsunamis, Nuclear and Chemical Terrorism. Hazards, Risks and Vulnerabilities, Vulnerability of a location and vulnerable groups, National policy on disaster Management.

Textbooks:

- Moaveni, S., Energy, Environment and Sustainability, Cengage(2018)
- Down to Earth, Environment Reader for Universities, CSE Publication(2018)
- Chapman, J.L. and Reiss, M.J., Ecology Principles and Application, Cambridge University Press (LPE) (1999).
- Eastop, T.P. and Croft, D.R., Energy Efficiency for Engineers and Technologists, Longman and Harow (2006).
- O'Callagan, P.W., Energy Management, Mc Graw Hill Book Co. Ltd.(1993).
- Peavy H.S. and Rowe D.R. Environmental Engineering, McGraw Hill(2013)

WME-111P Workshop							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
0	0	4	2	Maximum Marks: 30	Maximum Marks: 20	50	2 Hours
				Minimum Marks: 12	Minimum Marks: 8	20	

Following is the list of experiments/ jobs. Minimum 08 number of practicals are to be performed from following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

1.	**Introduction:**
	Introduction to Need and importance of workshop, different materials to be utilized Applications of Ferrous and Non-Ferrous metals alloys.
2.	**Carpentry Shop:**
	To prepare half-lap corner joint, mortise & tennon joints
3.	**Fitting Shop:**
	To make a job involving fitting work -drilling, tapping or dieing
4.	**Smithy Shop:**
	To make a job by using smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.
5.	**Welding Shop:**
	To prepare a simple butt and Lap welded joints.
6.	**Sheet-metal Shop:**
	Fabrication of Funnel, tool-box, tray etc.
7.	**Machine Shop:**
	To make a job on lathe involving plane turning, step turning, taper turning and threading operations
8.	**Foundry Shop:**
	To prepare a Mould with the use of a core and cast it.

WCS:111P/WIT:111P Workshop							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
0	0	4	2	Maximum Marks: 30	Maximum Marks: 20	50	2 Hours
				Minimum Marks: 12	Minimum Marks: 8	20	

Following is the list of experiments/ jobs. Minimum 08 number of practicals are to be performed from following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

1.	Identification and study of peripherals of a PC and Laptop
2.	Assembling and disassembling the PC
3.	Identification and study the purpose of Networking concepts
4.	Study / Prepare a network cable: Straight Through Cables vs Crossover Cables
5.	Prepare a document/report using Microsoft Word, Power Point, Microsoft Excel
6.	Prepare professional pdf documents using LaTeX
7.	Develop the home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list
8.	Operating System installation
9.	Virtual Machine setup
10.	Linux Operating System commands
11.	Enabling firewall and setting router as wireless access point in the system
12.	Study of AI based tools.

WEE-111P/WEEE-111P/ WEC-111P Workshop							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		Internal Assessment	End Semester Examination	Total	
0	0	4	2	Maximum Marks: 30	Maximum Marks: 20	50	2 Hours
				Minimum Marks: 12	Minimum Marks: 8	20	

Following is the list of experiments/ jobs. Minimum 08 number of practicals are to be performed from following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

Electrical Workshop	
1.	a) Demonstrate the precautionary steps adopted in case of Electrical shocks.
	b) Identify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings.
2.	Wiring of simple light circuit for controlling light/ fan point (PVC conduit wiring)
3.	Wiring of light/fan circuit using Two-way switches. (Staircase wiring)
4.	Wiring of Fluorescent lamps and light sockets (6A) with a power circuit for controlling power device. (16A socket)
5.	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.
6.	a) Identify different types of batteries with their specifications.
	b) Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit.
7.	Activity: Assemble the wooden/plastic boards, switches and sockets in form of extension boards with proper wiring and pin top.
Electronics Workshop	
8.	Familiarization/Identification of electronic components with specification (Functionality, type, size, colour coding, package, symbol, cost etc. [Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Crystals, Displays, Fasteners, Heat sink etc.)
9.	Drawing of electronic circuit diagrams using BIS/IEEE symbols and introduction to EDA tools (such as Orcad, MultiSim or XCircuit), Interpret data sheets of discrete components and IC's, Estimation and costing.
10.	Familiarization/Application of testing instruments and commonly used tools. [Multimeter, Function generator, Power supply, DSO etc.] [Soldering iron, Desoldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and de- soldering station etc.]
11.	Testing of electronic components [Resistor, Capacitor, Diode, Transistor and JFET using multimeter.]
12.	Overview of Arduino: Hardware and Software IDE: Installation and live projects burning such as LED Blinking, Running LEDs, Sand Glass Filling of LEDs, Decoration LEDs/LED Patterns etc.
13.	Printed circuit boards (PCB) [Types, Single sided, Double sided, PTH, Processing methods, Design and fabrication of a single sided PCB for a simple circuit]
14.	Activity: Assembling of components of a basic mobile phone system and develop an ability to repair and formulate a basic Transmission and Receiving system.

WTE-111P Workshop for Textile Engineering							
Teaching Scheme			**Credit**	**Marks Distribution**			**Duration of End Semester Examination**
L	**T**	**P**		**Internal Assessment**	**End Semester Examination**	**Total**	
0	**0**	**4**	**2**	**Maximum Marks: 30**	**Maximum Marks: 20**	**50**	**2 Hours**
				Minimum Marks: 12	**Minimum Marks: 8**	**20**	

Following is the list of experiments/ jobs. Minimum 08 number of practicals are to be performed from following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

1	Identification of different natural fibers.
2	Identification of different synthetic fibers.
3	Determination of linear density of yarn.
4	Analysis of various yarns structure and their basic properties.
5	Structural analysis of woven fabrics.
6	Structural analysis of knitted fabrics.
7	Dyeing of cotton fabric with natural dyes.
8	Dyeing of cotton fabric with synthetic dyes.
9	To prepare fabric sample for printing.
10	Characterization of various technical textiles and study of their application fields.