

Hindustan College of Science and Technology
Farah-Mathura
(AICTE approved & affiliated to AKTU)



Key Indicator 1.3
Curriculum Enrichment

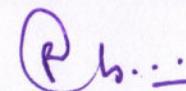
Metric 1.3.1

Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability in transacting the Curriculum

HINDUSTAN COLLEGE OF SCIENCE & TECHNOLOGY, FARAH MATHURA

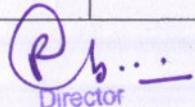
Details of courses which address the Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum.

S.No.	COURSE NAME	COURSE OUTCOMES	DOMAIN	Program in which offered
1	Human Values & Professional Ethics (KVE301/KVE401)	CO1: Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society CO2: Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Coexistence of Self and Body. CO3: Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in humanhuman relationships and explore their role in ensuring a harmonious society CO4: Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. CO5: Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work	Human Values/ Professional Ethics	For all Programs
2	CONSTITUTION OF INDIA, LAW AND ENGINEERING (KNC501/KNC601)	CO1: Identify and explore the basic features and modalities about Indian constitution. CO2: Differentiate and relate the functioning of Indian parliamentary system at the center and state level. CO3: Differentiate different aspects of Indian Legal System and its related bodies. CO4: Discover and apply different laws and regulations related to engineering practices CO5: Correlate role of engineers with different organizations and governance models	Human Value/Professional Ethics//Gender	Open Elective For all B.Tech Programs
3	Indian Tradition, Culture and Society (KNC502/KNC602)	CO1: To identify and understand the roots and details of Society State and Polity in India. CO2: To understand the importance of Indian Literature, Culture, Tradition, Practices and to apply in present system CO3: To analyze the Indian Religion, Philosophy, Practices and in shadow of PreVedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy and to apply in CO4: To analyze the Science, Management and Indian Knowledge System and to apply in present system. CO5: To evaluate the Indian Architect, Engineering and Architecture in Ancient India, Indian's Cultural Contribution to the World and to create environment in Arts.	Human Value/Professional Ethics	Open Elective For all B.Tech Programs
4	Value Relationship & Ethical Human Conduct - For a Happy & Harmonious Society (KOE076)	CO1 :Analyze the human aspirations, its fulfillment and need of universal human order. CO2: Analyze the types of Human-Human relationship & its fulfillment. CO3: Analyze justice from family to world family order CO4: Analyze the conceptual framework of undivided society as well as universal human order. CO5: Analyze the transition from current state to the undivided society and universal human order	Human Values, Professional Ethics	For all Programs
5	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING (KHU701/KHU801)	CO1: Students can understand the definitions, concepts and components of Rural Development CO2: Students will know the importance, structure, significance, resources of Indian rural economy CO3: Students will have a clear idea about the area development programmes and its impact CO4: Students will be able to acquire knowledge about rural entrepreneurship. CO5: Students will be able to understand about the using of different methods for human resource planning	Human Value/Professional Ethics	Open Elective For all B.Tech Programs

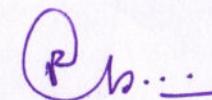


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6	Project Management & Entrepreneurship (KHU702)	CO1: Introduce various qualities required for entrepreneurship. CO2: Think creative and innovative, business Opportunities, value creation. CO3: Write and understand Project management, "Project Life Cycle, Project managerial skill CO4: Write project proposal, Project financing, Project Balance sheet CO5: Social Entrepreneurship, Social Innovators, Social venture CO6: Introduce various qualities required for entrepreneurship.	Human Value/Professional Ethics	Open Elective For all B.Tech Programs
7	Entrepreneurship Development (ROE-082)	CO1: The student should be able to identify and analyze the opportunities for entrepreneurship and innovation in various sectors. CO2: The student should be able to apply the principles of Project management including the idea generation, project identification, project formulation, project design and network analysis, project report, project appraisal. CO3: The student should be able to evaluate and analyse the financials of a business or enterprise. CO4: The student should be able to describe the funding opportunities and other financial alternatives available for business. CO5: The student should be able to explain the steps for setting up Small, Medium & Large scale industry. CO6: The student should be able to describe the incentives, subsidies and export possibilities available for biotech business.	Human Value/Professional Ethics	Open Elective For all B.Tech Programs
8	Technical Communication (KAS301)	CO1: Understand the nature and objective of Technical Communication relevant for the work place as Engineers. CO2: Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. CO3: Have effective Presentations skill to face diverse audience with confidence. CO4: Create a vast knowhow of the application of the learning to promote their technical competence. CO5: Evaluate their efficacy as fluent & efficient communicators by learning the Voice dynamics.	Professional Ethics	Open Elective For all B.Tech Programs
9	Energy Science & Engineering (KOE033)	CO1: In this unit students will be able to understand the various form of energy and its inter-conversion. Also, able to understand working and applications of various engines and turbines based on thermodynamic cycle. CO2: Students will be able to recognize and recall the basics of nuclear reactor terminology, definitions, and concepts associated with reactor physics and theory and technology of nuclear power plant. CO3: Able to explain the principles that underlie the ability of various natural phenomena to deliver solar energy. Outline the technologies that are used to harness the power of solar energy. CO4: Students able to understand processing and limitations of fossil fuels (coal, petroleum and natural gas) and necessity of harnessing alternate energy resources. CO5: Students may realize the environmental problems directly related to energy production and consumption includes air pollution, climate change, water pollution, thermal pollution, and solid waste disposal.	Environment and Sustainability	Open Elective For all B.Tech Programs
10	Electrical Vehicle (KOE090)	CO1: Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals. CO2: Analyze the use of different power electronics converters and electrical machines in hybrid electric vehicles. CO3: Able to interpret the working of different configurations of electric vehicles and its components, hybrid vehicle configurations CO4: Explain the use of different energy storage systems used for hybrid electric vehicles, their control techniques, and select appropriate energy balancing technology CO5: Ability to understand the control and configurations of HEV charging stations	Environment and Sustainability	Open Elective For all B.Tech Programs
11	Solid Waste Management (KCE074)	CO1. Understand the concept of solid waste management. CO2. Explain handling and processing of solid waste. CO3. Apply the concept of landfilling for disposal of solid waste. CO4. Design composting and other solid waste conversion units. CO5. Understand the various hazardous waste, risk assessment and legislation	Environment and Sustainability	B.Tech Civil Engineering


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12	Environment Engineering (KCE 603)	CO-1 Assess water demand and optimal size of water mains. CO-2 Layout the distribution system & assess the capacity of reservoir. CO-3 Investigate physical, chemical & biological parameter of water. CO-4 Design treatment units for water and waste water. CO-5 Apply emerging technologies for treatment of waste water.	Environment and Sustainability	B.Tech Civil Engineering
13	Environment & Ecology (BAS104 / BAS204)	CO-1 Gain in-depth knowledge on natural processes that sustain life, and govern Economy. CO-2 Estimate and Predict the consequences of human actions on the web of life, global economy and quality of human life. CO-3 Develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development. CO-4 Acquire values and attitudes towards understanding complex environmentaleconomic social challenges, and participate actively in solving current environmental problems and preventing the future ones. CO-5 Adopt sustainability as a practice in life, society and industry.	Environment and Sustainability	Open Elective For all B.Tech First Year Programs
14	Biosafety, Bioethics, IPR & Patents (KBT075)	CO1: Get an adequate knowledge on biosafety-regulatory framework for GMO's in India CO2: Understand biosafety-regulatory framework for GMOS at international level CO3: Identify the role bioethics in IPR CO4: Disseminate knowledge on different tools of IPR o make students aware about current trends in IPR and Govt. supports in promoting IPR CO5: Identify the role of Patent and Patent law	Environment and Sustainability	For Biotechnology Programs
15	Biofuels & Alcohol Technology (KBT 055)	CO1: Student will be able to explain the basic concepts of metabolism and importance of metabolic engineering CO2: Student will be able to understand the production of metabolites and its regulatory mechanism CO3: Student will be able to explain the applications, specificity and product inhibition of bioconversion CO4: Student will be able to understand the concept of regulation of enzyme production and strain improvement	Environment and Sustainability	For Biotechnology Programs
16	Renewable Energy Resources (KOE074)	CO1: Understand of renewable and nonrenewable sources of energy CO2: Gain knowledge about working principle of various solar energy systems CO3: Understand the application of wind energy and wind energy conversion system. CO4: Develop capability to do basic design of bio gas plant. CO5: Understand the applications of different renewable energy sources like ocean thermal, hydro, geothermal energy etc.	Environment and Sustainability	Open Elective For all B.Tech Programs



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**DR. A.P.J. ABDUL KALAM TECHNICAL
UNIVERSITY LUCKNOW**



**EVALUATION SCHEME & SYLLABUS
FOR**

**B. TECH 2nd YEAR
MECHANICAL ENGINEERING**

On

AICTE Model Curriculum

(EFFECTIVE FROM THE SESSION: 2019-20)

B.Tech. (Mechanical Engineering)

SEMESTER- III

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031-38/ KAS302	Engg. Science Course/Maths IV	3	1	0	30	20	50		100		150	4
2	KAS301/ KVE301	Technical Communication/Universal Human Values	2	1	0	30	20	50		100		150	3
			3	0	0								
3	KME301	Thermodynamics	3	1	0	30	20	50		100		150	4
4	KME302	Fluid Mechanics & Fluid Machines	3	1	0	30	20	50		100		150	4
5	KME303	Materials Engineering	3	0	0	30	20	50		100		150	3
6	KME351	Fluid Mechanics Lab	0	0	2					25	25	50	1
7	KME352	Material Testing Lab	0	0	2					25	25	50	1
8	KME353	Computer Aided Machine Drawing-I Lab	0	0	2					25	25	50	1
9	KME354	Mini Project or Internship Assessment*	0	0	2			50				50	1
10	KNC301/ KNC302	Computer System Security/Python Programming	2	0	0	15	10	25		50			0
11		MOOCs (Essential for Hons. Degree)											
		Total										950	22

*The Mini Project or internship (3-4 weeks) conducted during summer break after II semester and will be assessed during III semester.

SEMESTER- IV

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS402/ KOE041-48	Maths IV/Engg. Science Course	3	1	0	30	20	50		100		150	4
2	KVE401/ KAS401	Universal Human Values/Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3	KME401	Applied Thermodynamics	3	0	0	30	20	50		100		150	3
4	KME402	Engineering Mechanics	3	1	0	30	20	50		100		150	4
5	KME403	Manufacturing Processes	3	1	0	30	20	50		100		150	4
6	KME451	Applied Thermodynamics Lab	0	0	2					25	25	50	1
7	KME452	Manufacturing Processes Lab	0	0	2					25	25	50	1
8	KME453	Computer Aided Machine Drawing-II Lab	0	0	2					25	25	50	1
9	KNC402/ KNC401	Python Programming / Computer System Security	2	0	0	15	10	25		50			0
10		MOOCs (Essential for Hons. Degree)											
		Total										900	21

KVE301/
KVE 401/
KVE 301H/
KVE 401 H

Universal Human Values and Professional Ethics

L	T	P	C
3	0	0	3

Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

Course Outcome:

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

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Catalogue Description

Every human being has two sets of questions to answer for his life: a) what to do? and, b) how to do?. The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self-exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfillment in the nature and the co-existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and profession ahead.

UNIT-1

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Understanding the need, basic guidelines, content and process for Value Education, Self-Exploration—what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT-2

Understanding Harmony in the Human Being - Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

UNIT-3

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*) - from family to world family!.

UNIT-4

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

UNIT-5

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly

production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

Text Books:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

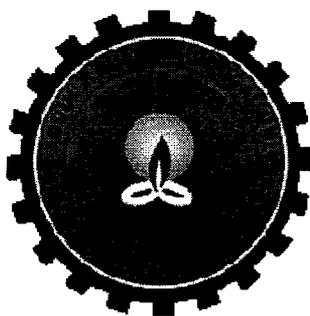
References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) KrishiTantraShodh, Amravati.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

Mode of Evaluation:

Assignment/ Seminar/Continuous Assessment Test/Semester End Exam

DR. A.P.J. ABDUL KALAM TECHNICAL
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EVALUATION SCHEME & SYLLABUS

FOR

NON CREDIT COURSE
(V & VI Semester)

1	KNC501/ KNC601	CONSTITUTION OF INDIA, LAW AND ENGINEERING
2	KNC502/ KNC602	INDIAN TRADITION, CULTURE AND SOCIETY

[Effective from the Session: 2020-21]

B.Tech.
V & VI Semester

1	KNC501/ KNC601	CONSTITUTION OF INDIA, LAW AND ENGINEERING
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Module 1--Introduction and Basic Information about Indian Constitution:

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947, Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

Module 2-Union Executive and State Executive:

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

Module 3- Introduction and Basic Information about Legal System:

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

Module 4- Intellectual Property Laws and Regulation to Information:

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information-Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

Module 5 -Business Organizations and E-Governance:

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up.

E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

COURSE OBJECTIVE:

- To acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.
- To make students aware of the theoretical and functional aspects of the Indian Parliamentary System.
- To channelize students' thinking towards basic understanding of the legal concepts and its implications for engineers.
- To acquaint students with latest intellectual property rights and innovation environment with related regulatory framework.
- To make students learn about role of engineering in business organizations and e-governance.

COURSE OUTCOME: At the end of the course, learners should be able to-

1. Identify and explore the basic features and modalities about Indian constitution.
2. Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
3. Differentiate different aspects of Indian Legal System and its related bodies.
4. Discover and apply different laws and regulations related to engineering practices.
5. Correlate role of engineers with different organizations and governance models

Pedagogy: Lecture, Problem based learning, Group discussions, Visual media, Films, Documentaries, Debate forums.

Suggested Readings:

- Brij Kishore Sharma: *Introduction to the Indian Constitution*, 8th Edition, PHI Learning Pvt. Ltd.
 - Granville Austin: *The Indian Constitution: Cornerstone of a Nation (Classic Reissue)*, Oxford University Press.
 - Subhash C. Kashyap: *Our Constitution: An Introduction to India's Constitution and constitutional Law*, NBT, 2018.
 - Madhav Khosla: *The Indian Constitution*, Oxford University Press.
 - PM Bakshi: *The Constitution of India*, Latest Edition, Universal Law Publishing.
 - V.K. Ahuja: *Law Relating to Intellectual Property Rights* (2007)
 - Suresh T. Viswanathan: *The Indian Cyber Laws*, Bharat Law House, New Delhi-88
 - P. Narayan: *Intellectual Property Law*, Eastern Law House, New Delhi
 - Prabudh Ganguli: *Gearing up for Patents: The Indian Scenario*, Orient Longman.
 - BL Wadehra: *Patents, Trademarks, Designs and Geological Indications Universal Law Publishing - LexisNexis.*
 - *Intellectual Property Rights: Law and Practice, Module III* by ICSI (only relevant sections)
 - Executive programme study material Company Law, Module II, by ICSI (The Institute of Companies Secretaries of India) (Only relevant sections i.e., Study 1, 4 and 36). <https://www.icsi.edu/media/webmodules/publications/Company%20Law.pdf>
 - Handbook on e-Governance Project Lifecycle, Department of Electronics & Information Technology, Government of India, https://www.meity.gov.in/writereaddata/files/e-Governance_Project_Lifecycle_Participant_Handbook-5Day_CourseV1_20412.pdf
 - Companies Act, 2013 Key highlights and analysis by PWC. <https://www.pwc.in/assets/pdfs/publications/2013/companies-act-2013-key-highlights-and-analysis.pdf>
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Referred Case Studies:

- Keshavanand Bharati V. State of Kerala, AIR 1973 SC 1461.
- Maneka Gandhi V. Union of India AIR, 1978 SC 597.
- S.R. Bammai V. Union of India, AIR 1994 SC 1918.
- Kuldeep Nayyar V. Union of India, AIR 2006 SC312.
- A.D.M. Jabalpur V. ShivkantShakla, AIR 1976 SC1207.
- Remshwar Prasad V. Union of India, AIR 2006 SC980.
- Keshav Singh in re, AIR 1965 SC 745.
- Union of India V. Talsiram, AIR 1985 SC 1416.
- Atiabari Tea Estate Co.V. State of Assam, AIR 1961SC232.
- SBP & Co. Vs. Patel Engg. Ltd. 2005 (8) SCC 618.
- Krishna Bhagya Jala Nigam Ltd. Vs. G. Arisandra Reddy (2007) 2 SCC 720.
- Oil & Natural Gas Corporation Vs. Saw Pipes Ltd. 2003 (4) SCALE 92 – 185.

**** (Other relevant case studies can be consulted by the teacher as per the topic).**

Prescribed Legislations:

1. Information Technology Act, 2000 with latest amendments.
2. RTI Act 2005 with latest amendments.
3. Information Technology Rules, 2000
4. Cyber Regulation Appellate Tribunal Rules, 2000

Suggested aid for Students and Pedagogic purpose

- RSTV debates on corporate law, IPR and patent issues
- NPTEL lectures on IPR and patent rights

Episodes of 10 -part mini TV series “Samvidhan: The Making of Constitution of India” by RSTV.

B.Tech.
V & VI Semester

2	KNC502/ KNC602	INDIAN TRADITION, CULTURE AND SOCIETY
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INDIAN TRADITIONS, CULTURAL AND SOCIETY

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Module 1- Society State and Polity in India

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women. Four-class Classification, Slavery.

Module 2- Indian Literature, Culture, Tradition, and Practices

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali, Prakrit And Sanskrit, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature, Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature

Module 3- Indian Religion, Philosophy, and Practices

Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.

Module 4- Science, Management and Indian Knowledge System

Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India ,Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times

Module 5- Cultural Heritage and Performing Arts

Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Seals, coins, Pottery, Puppetry, Dance, Music, Theatre, drama, Painting, Martial Arts Traditions, Fairs and Festivals, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema

COURSE OBJECTIVES:

- The course aims at imparting basic principles of thought process, reasoning and inference to identify the roots and details of some of the contemporary issues faced by our nation and try to locate possible solutions to these challenges by digging deep into our past.
 - To enable the students to understand the importance of our surroundings and encourage the students to contribute towards sustainable development.
 - To sensitize students towards issues related to 'Indian' culture, tradition and its composite character.
-

- To make students aware of holistic life styles of Yogic-science and wisdom capsules in Sanskrit literature that are important in modern society with rapid technological advancements and societal disruptions.
- To acquaint students with Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.

COURSE OUTCOMES: Ability to understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective.

Suggested Pedagogy for Teachers

- Project based learning
- Case studies
- Group discussion
- Presentations

Suggested Text & Reference Books

1. V. Sivaramakrishna (Ed.), *Cultural Heritage of India-Course Material*, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. S. Baliyan, *Indian Art and Culture*, Oxford University Press, India
3. Swami Jitatmanand, *Modern Physics and Vedant*, Bharatiya Vidya Bhavan
4. Romila Thapar, *Readings In Early Indian History* Oxford University Press , India
5. Fritz of Capra, *Tao of Physics*
6. Fritz of Capra, *The wave of Life*
7. V N Jha (English Translation), *Tarkasangraha of Annam Bhatta*, International Chinmay Foundation, Velliarnad, Amaku, am
8. *Yoga Sutra of Patanjali*, Ramakrishna Mission, Kolkatta
9. GN Jha (Eng. Trans.) Ed. R N Jha, *Yoga-darshanam with Vyasa Bhashya*, Vidyanidhi Prakasham, Delhi, 2016
10. RN Jha, *Science of Consciousness Psychotherapy and Yoga Practices*, Vidyanidhi Prakasham, Delhi, 2016
11. P R Sharma (English translation), *Shodashang Hridayam*
12. Basham, A.L., *The Wonder that was India* (34th impression), New Delhi, Rupa & co
13. Sharma, R.S., *Aspects of Political Ideas and Institutions in Ancient India*(fourth edition), Delhi, Motilal Banarsidass,

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EVALUATION SCHEME & SYLLABUS

FOR

OPEN ELECTIVES II LIST

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session:2021-22]

Note:

1. The Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the degree programme.
2. * It is mandatory that for these subjects (KOE069, KOE076, KOE087, KOE097 & KOE098) only Trained Faculty (who had done the FDP for these courses) will teach the courses.

OPEN ELECTIVES II LIST 2021-22

B.Tech. VII Semester (2021-22)

OPEN ELECTIVE-II

KOE071	FILTER DESIGN
KOE072	BIOECONOMICS
KOE073	MACHINE LEARNING
KOE074	RENEWABLE ENERGY RESOURCES
KOE075	OPERATIONS RESEARCH
KOE076	VALUE RELATIONSHIP & ETHICAL HUMAN CONDUCT- FOR A HAPPY & HARMONIOUS SOCIETY
KOE077	DESIGN THINKING
KOE078	SOIL AND WATER CONSERVATION ENGINEERING
KOE078	INTRODUCTION TO WOMEN'S AND GENDER STUDIES

ELECTRICAL ENGINEERING

ELECTRICAL ENGINEERING

EVALUATION SCHEME - B.TECH 4th YEAR

SEMESTER- VII													
Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	T A	Total	PS	TE	PE		
1	KHU701/KHU702	HSMC -1 #/ HSMC-2 #	3	0	0	30	20	50			100	150	3
2	KEE07X	Departmental Elective-IV	3	0	0	30	20	50			100	150	3
3	KEE07X	Departmental Elective-V	3	0	0	30	20	50			100	150	3
4	KOE07X	Open Elective-II	3	0	0	30	20	50			100	150	3
5	KEE751	Industrial Automation & PLC Lab	0	0	2					25	25	50	1
6	KEE752	Mini Project or Internship Assessment*	0	0	2					50		50	1
7	KEE753	Project I	0	0	8					150		150	4
8		MOOCs (Essential for Hons. Degree)											
		TOTAL	12	0	12							850	18

*The Mini Project or internship (4 - 6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.

<p>Department Elective - IV KEE070: Advanced Micro processors & Micro Controllers KEE071: Energy Conservation and Auditing KEE072: HVDC & AC Transmission KEE073: High Voltage Engineering KEE074: Power Quality and FACTS</p>	<p>Department Elective - V KEE075: Electric drives KEE076: Power System dynamics and Control KEE077: Power System Protection KEE078: Deregulated Power System KEE079: Utilization of Electrical Energy & Electric Traction</p>
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SEMESTER- VIII													
Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	C T	T A	Total	PS	TE	PE		
1	KHU801/KHU802	HSMC-2#/HSMC-1#	3	0	0	30	20	50			100	150	3
2	KOE08X	Open Elective-III	3	0	0	30	20	50			100	150	3
3	KOE08X	Open Elective-IV	3	0	0	30	20	50			100	150	3
4	KEE851	Project II	0	0	18					100	300	400	9
5		MOOCs (Essential for Hons. Degree)											
		Total	9	0	18							850	18

OPEN ELECTIVES II LIST 2021-22

KOE-076	VALUES, RELATIONSHIP & ETHICAL HUMAN CONDUCT-FOR A HAPPY & HARMONIOUS SOCIETY	3L:0T:0P	3 Credits
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Pre-requisites- for this subject only those faculty will teach these courses who had done the FDP for these courses.

Course Objectives:

1. To help the students to understand the importance and types of relationship with expressions.
2. To develop the competence to think about the conceptual framework of undivided society as well as universal human order.
3. To help the students to develop the exposure for transition from current state to the undivided society and universal human order.

Course Methodology:

1. The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. It is free from any dogma or set of do's and don'ts related to values.
3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated and encouraged to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.
4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.
5. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.

Unit	Topics	Lectures
I	Introduction to the course: Basic aspiration of a Human Being and program for its fulfilment, Need for family and relationship for a Human Being, Human-relationship and role of work in its fulfilment, Comprehensive Human Goal, Need for Undivided Society, Need for Universal Human Order, an appraisal of the Current State, Appraisal of Efforts in this Direction in Human History.	8
II	Understanding Human-Human Relationship & its fulfilment: Recognition of Human-Human Relationship, Recognition of feelings in relationship, Established Values and Expressed Values in Relationship, interrelatedness of feelings and their fulfilment, Expression of feelings, Types of relationship and their purpose, mutual evaluation in relationship, Meaning of justice in relationship, Justice leading to culture, civilization and Human Conduct.	8
III	Justice from family to world family order: Undivided Society as continuity and expanse of Justice in behaviour – family to world family order, continuity of culture and civilization, Universal Order on the basis of Undivided Society, Conceptual Framework for Universal human order, Universal Human Order as continuity and expanse of order in living: from family order to world family order, a conceptual framework for universal human order.	8

OPEN ELECTIVES II LIST 2021-22

IV	Program for Ensuring Undivided Society and Universal Human Order: Education –Sanskar, Health –Sanyam, Production-work, Exchange – storage, Justice-preservation.	8
V	Human Tradition: Scope and Steps of Universal Human Order, Human Tradition (Ex. Family order to world family order), Steps for transition from the current state, Possibilities of participation of students in this direction, Present efforts in this direction, Sum up.	8

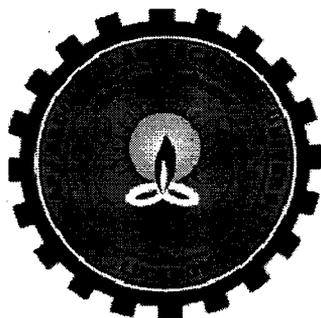
Text books:

1. A Foundation Course in Human Values and Profession Ethics (Text Book and Teachers' Manual), R. R. Gaur, R. Asthana, G. P. Bagaria (2010), Excel Books, New Delhi.
2. Avartansheel Arthshastra, A. Nagraj, Divya Path Sansthan, Amarkantak, India.
3. An Appeal by the Dalai Lama to the World: Ethics Are More Important Than Religion, Dalai Lama XIV, 2015.
4. Economy of Permanence – (a quest for social order based on non-violence), J. C. Kumarappa (2010), Sarva-Seva-Sangh-Prakashan, Varansi, India.
1. Energy and Equity, Ivan Illich (1974), The Trinity Press, Worcester & Harper Collins, USA.
2. Human Society, Kingsley Davis, 1949.
3. Hind Swaraj or, Indian home rule Mohandas K. Gandhi, 1909.
4. Integral Humanism, Deendayal Upadhyaya, 1965.
5. Lohiya Ke Vichar, Lok Bharti , Rammanohar Lohiya, 2008.
6. Manav Vyavahar Darshan, A. Nagraj, Divya Path Sansthan, Amarkantak, India.
7. Manaviya Sanvidhan, A. Nagraj, Divya Path Sansthan, Amarkantak, India
8. Samadhanatmak Bhautikvad, A. Nagraj, Divya Path Sansthan, Amarkantak, India
9. Small Is Beautiful: A Study of Economics as if People Mattered, E. F. Schumacher, 1973, Blond & Briggs, UK.
10. Slow is Beautiful, Cecile Andrews (<http://www.newsociety.com/Books/S/Slow-is-Beautiful>)
11. Sociology Themes and Perspectives, Harper Collins; EIGHT edition (2014), Martin Holborn and Peter Langley, 1980.
12. Samagra kranti: Jaya Prakash Narayan's philosophy of social change, Siddharth Publications Renu Sinha, 1996.
13. Science & Humanism – towards a unified worldview, P. L. Dhar & R. R. Gaur (1990), Commonwealth Publishers, New Delhi
14. Vyavaharvadi Samajshastra, A. Nagraj, Divya Path Sansthan, Amarkantak, India.
15. Vyavahatmak Janvad, A. Nagraj, Divya Path Sansthan, Amarkantak, India.
16. The Communist Manifesto, Karl Marx, 1848.
17. Toward a True Kinship of Faiths: How the World's Religions Can Come Together Dalai Lama XIV, 2011

Reference Videos.

1. Kin school (30 minutes)
2. Technology (Solar City etc.).
3. Natural Farming.
4. Economics of Happiness (1h 8m).

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UTTAR PRADESH, LUCKNOW**



EVALUATION SCHEME & SYLLABUS

FOR

**HUMANITIES, SOCIAL SCIENCE AND
MANAGEMENT COURSE**

(HSMC COURSE)

&

OPEN ELECTIVES II LIST

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session:2021-22]

Note:

1. The Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the degree programme.
2. * It is mandatory that for these subjects (KOE069, KOE076, KOE087, KOE097 & KOE098) only Trained Faculty (who had done the FDP for these courses) will teach the courses.

COMPUTER SCIENCE AND ENGINEERING/CS

B.TECH

(COMPUTER SCIENCE & ENGINEERING/CS) CURRICULUM STRUCTURE

SEMESTER- VII

Sl. No.	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU701/KHU702	HSMC -1 / HSMC-2	3	0	0	30	20	50		100		150	3
2	KCS07X	Departmental Elective-IV	3	0	0	30	20	50		100		150	3
3	KCS07X	Departmental Elective-V	3	0	0	30	20	50		100		150	3
4	KOE07X	Open Elective-II	3	0	0	30	20	50		100		150	3
5	KCS751A	The Department may conduct one Lab of either of the two Electives (4 or 5) based on the elective chosen for the curriculum. The Department shall on its own prepare complete list of practical for the Lab and arrange for proper setup and conduct accordingly.	0	0	2				25		25	50	1
6	KCS752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KCS753	Project	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	12	0	12							850	18

*The Mini Project or internship (4 - 6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.

SEMESTER- VIII

Sl. No.	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU801/KHU802	HSMC-1#/HSMC-2#	3	0	0	30	20	50		100		150	3
2	KOE08X	Open Elective-III	3	0	0	30	20	50		100		150	3
3	KOE08X	Open Elective-IV	3	0	0	30	20	50		100		150	3
4	KCS851	Project 1	0	0	18				100		300	400	9
5		MOOCs (Essential for Hons. Degree)											
		Total	9	0	18							850	18

HSMC & OPEN ELECTIVES II LIST 2021-22

B.Tech. VII Semester (2021-22)

HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSE (HSMC COURSE) HSMC1/HSMC2

KHU701/ KHU801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING
KHU702/ KHU802	PROJECT MANAGEMENT & ENTREPRENEURSHIP

OPEN ELECTIVE-II

KOE071	FILTER DESIGN
KOE072	BIOECONOMICS
KOE073	MACHINE LEARNING
KOE074	RENEWABLE ENERGY RESOURCES
KOE075	OPERATIONS RESEARCH
KOE076	VISION FOR HUMANE SOCIETY
KOE077	DESIGN THINKING
KOE078	SOIL AND WATER CONSERVATION ENGINEERING
KOE079	INTRODUCTION TO WOMEN'S AND GENDER STUDIES

HSMC & OPEN ELECTIVES II LIST 2021-22

KHU701/ KHU801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	3L:0T:0P	3 Credits
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COURSE OUTCOME: After completion of the course student will be able to:

1. Students can understand the definitions, concepts and components of Rural Development
2. Students will know the importance, structure, significance, resources of Indian rural economy.
3. Students will have a clear idea about the area development programmes and its impact.
4. Students will be able to acquire knowledge about rural entrepreneurship.
5. Students will be able to understand about the using of different methods for human resource planning

Unit	Topics	Lectures
I	Rural Planning & Development: Concepts of Rural Development, Basic elements of rural Development, and Importance of Rural Development for creation of Sustainable Livelihoods, An overview of Policies and Programmes for Rural Development- Programmes in the agricultural sector, Programmes in the Social Security, Programmes in area of Social Sector.	8
II	Rural Development Programmes: Sriniketan experiment, Gurgaon experiment, marthandam experiment, Baroda experiment, Firkha development scheme, Etawa pilot project, Nilokheri experiment, approaches to rural community development: Tagore, Gandhi etc	8
III	Panchayati Raj & Rural Administration: Administrative Structure: bureaucracy, structure of administration; Panchayati Raj Institutions Emergence and Growth of Panchayati Raj Institutions in India; People and Panchayati Raj; Financial Organizations in Panchayati Raj Institutions, Structure of rural finance, Government & Non-Government Organizations / Community Based Organizations, Concept of Self help group.	8
IV	Human Resource Development in Rural Sector: Need for Human Resource Development, Elements of Human Resource Development in Rural Sector Dimensions of HRD for rural development-Health, Education, Energy, Skill Development, Training, Nutritional Status access to basic amenities - Population composition.	8
V	Rural Industrialization and Entrepreneurship: Concept of Rural Industrialization, Gandhian approach to Rural Industrialization, Appropriate Technology for Rural Industries, Entrepreneurship and Rural Industrialization-Problems and diagnosis of Rural Entrepreneurship in India, with special reference to Women Entrepreneurship; Development of Small Entrepreneurs in India, need for and scope of entrepreneurship in Rural area.	8

Text Book:

1. Corporate Social Responsibility: An Ethical Approach - Mark S. Schwartz
2. Katar Singh: Rural Development in India – Theory History and Policy
3. Todaro M.P. Economic Development in III World war
4. Arora R.C – Integrated Rural Development in India
5. Dhandekar V.M and Rath N poverty in India
6. A.N. Agarwal and Kundana Lal: Rural Economy of India
7. B.K. Prasad: Rural Development-Sarup & Son's Publications.

HSMC & OPEN ELECTIVES II LIST 2021-22

6

KHU702/ KHU802	PROJECT MANAGEMENT & ENTREPRENEURSHIP	3L:0T:0P	3 Credits
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Unit	Topics	Lectures
I	Entrepreneurship: Entrepreneurship: need, scope , Entrepreneurial competencies & traits, Factors affecting entrepreneurial development, Entrepreneurial motivation (Mc Clelland's Achievement motivation theory), conceptual model of entrepreneurship , entrepreneur vs. intrapreneur; Classification of entrepreneurs; Entrepreneurial Development Programmes	8
II	Entrepreneurial Idea and Innovation: Introduction to Innovation, Entrepreneurial Idea Generation and Identifying Business Opportunities, Management skills for Entrepreneurs and managing for Value Creation, Creating and Sustaining Enterprising Model & Organizational Effectiveness	8
III	Project Management: Project management: meaning, scope & importance, role of project manager; project life-cycle Project appraisal: Preparation of a real time project feasibility report containing Technical appraisal,; Environmental appraisal, Market appraisal (including market survey for forecasting future demand and sales) and Managerial appraisal.	8
IV	Project Financing: Project cost estimation & working capital requirements, sources of funds, capital budgeting, Risk & uncertainty in project evaluation , preparation of projected financial statements viz. Projected balance sheet, projected income statement, projected funds & cash flow statements, Preparation of detailed project report, Project finance.	8
V	Social Entrepreneurship: Social Sector Perspectives and Social Entrepreneurship, Social Entrepreneurship Opportunities and Successful Models, Social Innovations and Sustainability, Marketing Management for Social Ventures, Risk Management in Social Enterprises, Legal Framework for Social Ventures.	8

Text Book:

1. Innovation and Entrepreneurship by Drucker, P.F.; Harper and Row
2. Business, Entrepreneurship and Management: Rao, V.S.P. ;Vikas
3. Entrepreneurship: Roy Rajeev; OUP.
4. Text Book of Project Management: Gopalkrishnan, P. and Ramamoorthy, V.E.; McMillan
5. Project Management for Engineering, Business and Technology: Nicholas, J.M., and Steyn, H.; PHI
6. Project Management: The Managerial Process: Gray, C.F., Larson, E.W. and Desai, G.V.; MGH

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Open Electives
For
Bachelor of Technology
(Choice Based Credit System)

7th & 8th Semester, 2019-20

SEVENTH SEMESTER										
Sl.No.	Subject Code	Subject Name	Department	L-T-P	Th/Lab Marks		Sessional		Total	Credit
					ESE		CT	TA		
1		OPEN ELECTIVE COURSE-1	Other Deptt.	3-0-0	70		20	10	100	3
2		DEPTT ELECTIVE COURSE-3	Core Deptt.	3-0-0	70		20	10	100	3
3		DEPTT ELECTIVE COURSE-4	Core Deptt.	3-1-0	70		20	10	100	4
4	RME701	CAD/CAM	Core Deptt.	3-1-0	70		20	10	100	4
5	RME702	Automobile Engineering	Core Deptt.	3-0-0	70		20	10	100	3
6	RME751	CAD/CAM Lab	Core Deptt.	0-0-2	50			50	100	1
7	RME752	IC Engine & Automobile Lab	Core Deptt.	0-0-2	50			50	100	1
8	RME753	INDUSTRIAL TRAINING	Core Deptt.	0-0-3				100	100	2
9	RME754	PROJECT-1	Core Deptt.	0-0-6				200	200	3
	TOTAL				450		100	450	1000	24

DEPARTMENTAL ELECTIVE-3	
Sub.Code	Subject Name
RME070	Composite Materials
RME071	Power Plant Engineering
RME072	Supply Chain Management
RME073	Additive Manufacturing

DEPARTMENTAL ELECTIVE-4	
S.Code	Subject Name
RME075	Operation Research
RME076	Modelling & Simulation
RME077	Computational Fluid Dynamics
RME078	Automation & Robotics

EIGHT SEMESTER										
Sl.No.	Subject Code	Subject Name	Department	L-T-P	Th/Lab Marks		Sessional		Total	Credit
					ESE		CT	TA		
1		OPEN ELECTIVE COURSE-2	Other Deptt.	3-0-0	70		20	10	100	3
2		DEPTT ELECTIVE COURSE-5	Core Deptt.	3-1-0	70		20	10	100	4
3		DEPTT ELECTIVE COURSE-6	Core Deptt.	3-0-0	70		20	10	100	3
4	RME851	SEMINAR	Core Deptt.	0-0-3				100	100	2
5	RME852	PROJECT-2	Core Deptt.	0-0-12	350			250	600	12
	TOTAL				560		60	380	1000	24

DEPARTMENTAL ELECTIVE-5	
Sub.Code	Subject Name
RME080	Non-Destructive Testing
RME081	Advance Welding
RME082	Thermal Turbo Machine
RME083	Energy Conservation & Management

S.Code MOOC Subject Name
RME084 Industrial Safety Engineering.

DEPARTMENTAL ELECTIVE-6	
S.Code	Subject Name
RME085	Total Quality Management
RME086	Gas Dynamics & Jet Propulsion
RME087	Design & Transmission System
RME088	Theory of Elasticity.

S.Code MOOC Subject Name
RME089 Manufacturing of Composites.

Open Electives for B.Tech 4 th year (CBCS)		
Open Electives I (VII Semester)		
Sl. No.	Subject Code	Name of Elective(s)
1	ROE071	Modelling and Simulation of Dynamic Systems
2	ROE072	Introduction to Smart Grid
3	ROE073	Cloud computing
4	ROE074	Understanding the human being Comprehensively Human Aspiration audits fulfilment
Open Electives II (VIII Semester)		
Sl. No.	Subject Code	Name of Elective(s)
1	ROE081	Digital and Social Media Marketing
2	ROE082	Entrepreneurship Development
3	ROE083	Machine Learning
4	ROE084	Micro and Smart Systems
5	ROE085	Operations Research
6	ROE086	Renewable Energy Resources
7	ROE087	*Human Values in Madhyasth Darshan
8	ROE088	*Values, Relationship & Ethical Human Conduct-For a Happy & Harmonious Society

Note:

1. The Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the degree programme.
2. * It is mandatory that for these two subjects (ROE087 & ROE088) only trained faculty (who had done the FDP for these courses) will teach the courses.

- UNIT-I** Entrepreneurship- definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. Government policy for small scale industry; stages in starting a small scale industry.
- UNIT-II** Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.
- UNIT-III** Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.
- UNIT-IV** Project Planning and control: The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication.
- UNIT-V** Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.

Text books:

1. Forbat, John, "Entrepreneurship" New Age International.
2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New Age International
3. Joseph, L. Massod, "Essential of Management", Prentice Hall of India

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EVALUATION SCHEME & SYLLABUS

FOR

B. TECH. SECOND YEAR

(CIVIL ENGINEERING)

(Effective from session 2019-20)

THIRD SEMESTER

CIVIL ENGINEERING

SESSION 2019-20

S.No	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031-38/KAS303	Engineering Science Course/Maths III	3	1	0	30	20	50		100		150	4
2	KAS301/ KVE301	Technical Communication/ Universal Human Values	2	1	0	30	20	50		100		150	3
			3	0	0								
3	KCE301	Engg. Mechanics	3	1	0	30	20	50		100		150	4
4	KCE302	Surveying and Geomatics	3	1	0	30	20	50		100		150	4
5	KCE303	Fluid Mechanics	3	0	0	30	20	50		100		150	3
6	KCE351	Building Planning & Drawing Lab	0	0	2				25		25	50	1
7	KCE352	Surveying and Geomatics Lab	0	0	2				25		25	50	1
8	KCE353	Fluid Mechanics Lab	0	0	2				25		25	50	1
9	KCE354	Mini Project or Internship Assessment*	0	0	2			50				50	1
10	KNC301/ KNC302	Computer System Security/ Python Programming	2	0	2	15	10	25		50			0
11		MOOCs (Essential for Hons. Degree)											
Total												950	22

*The Mini Project or Internship (3-4 weeks) conducted during summer break after II semester and will be assessed during III semester.

SEMESTER - IV

S.No	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS403/ KOE041-48	Maths III/ Engg. Science Course	3	1	0	30	20	50		100		150	4
2	KVE401/ KAS401	Universal Human Values/Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3	KCE401	Materials, Testing & Construction Practices	3	0	0	30	20	50		100		150	3
4	KCE402	Introduction to Solid Mechanics	3	1	0	30	20	50		100		150	4
5	KCE403	Hydraulic Engineering and Machines	3	1	0	30	20	50		100		150	4
6	KCE451	Material Testing Lab	0	0	2				25		25	50	1
7	KCE452	Solid Mechanics Lab	0	0	2				25		25	50	1
8	KCE453	Hydraulics & Hydraulic Machine Lab	0	0	2				25		25	50	1
9	KNC402/ KNC401	Python Programming/Computer System Security	2	0	0	15	10	25		50			0
10		MOOCs (Essential for Hons. Degree)											
Total												900	21

Technical Communication
(KAS301/401)
(Effective from the session 2019-20)

L T P
2 1 0

Unit -1 Fundamentals of Technical Communication:

Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication.

Unit - II Forms of Technical Communication:

Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration, C.V./Resume writing; Technical Proposal: Types, Structure & Draft.

Unit - III Technical Presentation: Strategies & Techniques

Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear; Audience Analysis & retention of audience interest; Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections.

Unit - IV Technical Communication Skills:

Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation skills: Focus; Content; Style; Argumentation skills: Devices: Analysis; Cohesion & Emphasis; Critical thinking; Nuances: Exposition narration & Description; effective business communication competence: Grammatical; Discourse competence: combination of expression & conclusion; Socio-linguistic competence: Strategic competence: Solution of communication problems with verbal and non verbal means.

Unit - V Dimensions of Oral Communication & Voice Dynamics:

Code and Content; Stimulus & Response; Encoding process; Decoding process; Pronunciation Etiquette; Syllables; Vowel sounds; Consonant sounds; Tone: Rising tone; Falling Tone; Flow in Speaking; Speaking with a purpose; Speech & personality; Professional Personality Attributes: Empathy; Considerateness; Leadership; Competence.

Reference Books

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Spoken English- A Manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.

6. **Modern Technical Writing** by Sherman, Theodore A (et.al); Apprenice Hall; New Jersey; U.S.
7. **A Text Book of Scientific and Technical Writing** by S.D. Sharma; Vikas Publication, Delhi.
8. **Skills for Effective Business Communication** by Michael Murphy, Harward University, U.S.
9. **Business Communication for Managers** by Payal Mehra, Pearson Publication, Delhi.

Course Outcomes

1. Students will be enabled to **understand** the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Students will **utilize** the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Students would imbibe inputs by presentation skills to **enhance** confidence in face of diverse audience.
4. Technical communication skills will **create** a vast know-how of the application of the learning to promote their technical competence.
5. It would enable them to **evaluate** their efficacy as fluent & efficient communicators by learning the voice-dynamics.

2021-22
KIRIT'S COLLEGE

9

Engineering Science Courses for B.Tech.(AICTE Model Curriculum) 3rd Year
(effective from the session 2019-20)

SEMESTER- III													
Sl.No.	Subject Codes	Subject	Periods	Evaluation Scheme					End Semester			Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031/041	Engineering Mechanics	3	1	0	30	20	50		100		150	4
2	KOE032/042	Material Science	3	1	0	30	20	50		100		150	4
3	KOE033/043	Energy Science & Engineering	3	1	0	30	20	50		100		150	4
4	KOE034/044	Sensor & Instrumentation	3	1	0	30	20	50		100		150	4
5	KOE035 /045	Basics Data Structure & Algorithms	3	1	0	30	20	50		100		150	4
6	KOE036 /046	Introduction to Soft Computing	3	1	0	30	20	50		100		150	4
7	KOE037/047	Analog Electronics	3	1	0	30	20	50		100		150	4
8	KOE038 /048	Electronics Engineering	3	1	0	30	20	50		100		150	4

Sl.No.	Subject	
1	Engineering Mechanics	To be offered to any Engg. Branch except ME/CE/AG and allied branches
2	Material Science	
3	Energy Science & Engineering	To be offered to any Engg. Branch except EE and allied branches
4	Sensor & Instrumentation	
5	Basics Data Structure & Algorithms	To be offered to any Engg. Branch except CSE and allied branches
6	Introduction to Soft Computing	
7	Analog Electronics	To be offered to any Engg. Branch except EC and allied branches
8	Electronics Engineering	

Important Note: CH/BT/TX Engg. And allied branches can be offered any of the above listed ES

Energy Science and Engineering

Unit-I Energy and its Usage: Units and scales of energy use, Mechanical energy and transport, Heat energy: Conversion between heat and mechanical energy, Electromagnetic energy: Storage, conversion, transmission and radiation, Introduction to the quantum, energy quantization, Energy in chemical systems and processes, flow of CO₂, Entropy and temperature, Carnot and Stirling heat engines, Phase change energy conversion, refrigeration and heat pumps, Internal combustion engines, Steam and gas power cycles, the physics of power plants. Solid-state phenomena including photo, thermal and electrical aspects

Unit-II Nuclear Energy: Fundamental forces in the universe, Quantum mechanics relevant for nuclear physics, Nuclear forces, energy scales and structure, Nuclear binding energy systematics, reactions and decays, Nuclear fusion, Nuclear fission and fission reactor physics, Nuclear fission reactor design, safety, operation and fuel cycles

Unit-III Solar Energy: Introduction to solar energy, fundamentals of solar radiation and its measurement aspects, Basic physics of semiconductors, Carrier transport, generation and recombination in semiconductors, Semiconductor junctions: metal-semiconductor junction & p-n junction, Essential characteristics of solar photovoltaic devices, First Generation Solar Cells, Second Generation Solar Cells, Third Generation Solar Cells

Unit-IV Conventional & non-conventional energy source: Biological energy sources and fossil fuels, Fluid dynamics and power in the wind, available resources, fluids, viscosity, types of fluid flow, lift, Wind turbine dynamics and design, wind farms, Geothermal power and ocean thermal energy conversion, Tidal/wave/hydro power

Unit-V Systems and Synthesis: Overview of World Energy Scenario, Nuclear radiation, fuel cycles, waste and proliferation, Climate change, Energy storage, Energy conservation. Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts, LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption

Reference/Text Books

1. Energy and the Challenge of Sustainability, World Energy Assessment, UNDP, New York, (2000).
2. Perspective of Modern Physics, A. Beiser, McGraw-Hill International Editions (1968).
3. Introduction to Modern Physics, H.S. Mani and G.K.Mehta, East-West Press (1988).
4. Introduction to Electrodynamics, D. J. Griffiths, Fourth Edition, Prentice Hall (2013).
5. Introductory Nuclear Physics, R. K. Puri and V.K. Babbar, Narosa Publishing House (1996).
6. Physics of Solar Cells: From Basic Principles to Advanced Concepts by Peter Würfel, John Wiley & Sons, 2016
7. Principles of Solar Engineering, D.Y. Goswami, F.Kreith and J.F. Kreider, Taylor and Francis, Philadelphia, 2000.

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY
UTTAR PRADESH, LUCKNOW



EVALUATION SCHEME & SYLLABUS

FOR

III & IV
OPEN ELECTIVES LIST

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session: 2021-22]

Note:

1. The Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the degree programme.
2. ** It is mandatory that for these subjects (KOE089, KOE098 & KOE099) only Trained Faculty (who had done the FDP for these courses) will teach the courses.

B. TECH.
VIII Semester (2021-22)

OPEN ELECTIVE –III

KOE-081	CLOUD COMPUTING
KOE-082	BIO MEDICAL SIGNAL PROCESSING
KOE-083	ENTREPRENEURSHIP DEVELOPMENT
KOE-084	INTRODUCTION TO SMART GRID
KOE-085	QUALITY MANAGEMENT
KOE-086	INDUSTRIAL OPTIMIZATION TECHNIQUES
KOE-087	VIROLOGY
KOE-088	NATURAL LANGUAGE PROCESSING
KOE-089	**HUMAN VALUES IN MADHYASTH DARSHAN

OPEN ELECTIVE –IV

KOE-090	ELECTRIC VEHICLES
KOE-091	AUTOMATION AND ROBOTICS
KOE-092	COMPUTERIZED PROCESS CONTROL
KOE-093	DATA WAREHOUSING & DATA MINING
KOE-094	DIGITAL AND SOCIAL MEDIA MARKETING
KOE-095	MODELING OF FIELD-EFFECT NANO DEVICES
KOE-096	MODELLING AND SIMULATION OF DYNAMIC SYSTEMS
KOE-097	BIG DATA
KOE-098	**HUMAN VALUES IN BUDDHA AND JAIN DARSHAN
KOE-099	**HUMAN VALUES IN VEDIC DARSANA

ELECTRICAL ENGINEERING

ELECTRICAL ENGINEERING

EVALUATION SCHEME - B.TECH 4th YEAR

SEMESTER- VII													
Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	T A	Total	PS	TE	PE		
1	KHU701 /KHU702	HSMC -1 #/ HSMC-2 #	3	0	0	30	20	50		100		150	3
2	KEE07X	Departmental Elective-IV	3	0	0	30	20	50		100		150	3
3	KEE07X	Departmental Elective-V	3	0	0	30	20	50		100		150	3
4	KOE07X	Open Elective-II	3	0	0	30	20	50		100		150	3
5	KEE751	Industrial Automation & PLC Lab	0	0	2				25		25	50	1
6	KEE752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KEE753	Project I	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		TOTAL	12	0	12							850	18

*The Mini Project or internship (4 - 6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.

<p>Department Elective - IV KEE070: Advanced Micro processors & Micro Controllers KEE071: Energy Conservation and Auditing KEE072: HVDC & AC Transmission KEE073: High Voltage Engineering KEE074: Power Quality and FACTS</p>	<p>Department Elective - V KEE075: Electric drives KEE076: Power System dynamics and Control KEE077: Power System Protection KEE078: Deregulated Power System KEE079: Utilization of Electrical Energy & Electric Traction</p>
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SEMESTER- VIII

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	C T	T A	Total	PS	TE	PE		
1	KHU801/ KHU802	HSMC-2#/HSMC-1#	3	0	0	3	2	50		100		150	3
2	KOE08X	Open Elective-III	3	0	0	3	2	50		100		150	3
3	KOE08X	Open Elective-IV	3	0	0	3	2	50		100		150	3
4	KEE851	Project II	0	0	18				100		300	400	9
5		MOOCs (Essential for Hons. Degree)											
		Total	9	0	18							850	18

KOE090 ELECTRIC VEHICLES		
DETAILED SYLLABUS		3-1-0
Unit	Topic	Proposed Lecture
I	Introduction of Electric Vehicles: Concept of Electrified transportation, Past, present status of electric vehicles, Recent developments and trends in electric vehicles, Comparison of EVs and IC Engine vehicles, Understanding electric vehicle components, Basic EV components and architecture, Autonomy and vehicle computing needs.	08
II	Electric Motor Drives for EV applications: Concept of EV motors, Classification of EV motors, Comparison of Electric motors for EV applications, Recent EV motors, BLDC and SRM, axial flux motor. Introduction to power electronics converters, DC-DC converter, speed control of dc motor, BLDC motor driving schemes.	08
III	EV Batteries and Battery Management System: EV batteries, Lead Acid batteries – Basics, Characteristics, Lithium batteries- Basics, Characteristics, Selection of battery for EVs, Smart battery pack design, Mechanical and reliability aspects of Li Ion packs, UN38 regulation familiarity, Cell balancing in Li Ion, Battery second life and usage in BESS (energy storage systems). BMS - Global price trends, volumetric and gravimetric efficiency trends	08
IV	Charging system design technology for EV applications: Charging system design considerations, AC & DC Charging, Charging methods, On-board/Off-board chargers, Vehicle to charger communication system, OCPP familiarity cloud and device side, metrology, billing and authentication types, understand the computing needs in a charging system, Understand internal major block diagrams and subsystems of low and high power chargers. IEC61850 and 61851 familiarities, IEC61000, 60950/51, IEC62196 key highlights.	08
V	EV Charging Facility Planning: Identification of EV demand, Impact of EV charging on power grid, Energy generation scheduling, different power sources, centralized charging schemes, Energy storage integration into micro-grid, Overview and applicability of AI for the EV ecosystem, design of V2G aggregator, case studies.	08

Reference:

1. C.C.Chan, K.T.Chau. Modern Electric Vehicle Technology, Oxford University Press, NY 2001
2. M.Ehsani, Y.Gao, S.E.Gay, A.Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles – Fundamentals, Theory and Design, CRC Press, 2004
3. James Larminie, John Lowry. Electric Vehicle Technology Explained. Wiley 2012
4. NPTEL Course on Electric Vehicles – Part 1 by Dr. Amit Jain, IIT Delhi
5. Tests on Lithium-ion batteries. Available at: <https://www.lithium-batterie-service.de/en/un-38.3-test-series>
6. Handbook on Battery Energy Storage Systems- ADB, 2018

Addition Practical Hand (Lab works):

- a. BLDC motor control experiment
- b. E-rickshaw commercial BLDC and driver based live demo
- c. Charge discharge characteristics of Li-Ion batteries and cells
- d. BMS function SoC, SoH and cell balancing demo
- e. PFC demo and waveform capture
- f. LLC (DCDC) demo and waveform capture
- g. CV, CC operation
- h. Tear down analysis of DC fast charger and AC fast charger

CIVIL ENGINEERING

DR. A.P.J. ABDUL KALAM TECHNICAL
UNIVERSITY, UTTAR PRADESH, LUCKNOW



EVALUATION SCHEME & SYLLABUS

FOR

B. TECH. FOURTH YEAR

CIVIL ENGINEERING

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session: 2021-22]

CIVIL ENGINEERING

SEVENTH SEMESTER

CIVIL ENGINEERING

SESSION 2021-22

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU701/ KHU702	HSMC-1*/HSMC-2*	3	0	0	30	20	50		100		150	3
2		Departmental Elective -IV	3	0	0	30	20	50		100		150	3
	KCE 070	Railway, Waterway and Airway Engineering											
	KCE 071	Sustainable Construction Methods											
	KCE 072	Probability Methods in Civil Engineering											
	KCE 073	Advance Concrete Design											
	KCE 074	Solid Waste Management											
3		Departmental Elective -V	3	0	0	30	20	50		100		150	3
	KCE 075	Design of Steel Structures											
	KCE 076	Urban Transportation Planning											
	KCE 077	Geosynthetics and Reinforced Soil Structures											
	KCE 078	Irrigation and Water Resource Engineering											
	KCE 079	Disaster Preparedness and Management											
4		Open Elective-II	3	0	0	30	20	50		100		150	3
5	KCE751	Concrete Lab	0	0	2				25		25	50	1
6	KCE752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KCE753	Project	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	12	0	12							850	18

NOTE:

1. Regular classroom interaction with industry experts is to be ensured in all theory courses (minimum two expert talks from relevant Industry).
2. Working on experiments using virtual labs is to be ensured in lab courses.
3. Student's visit to Industry/Industry Expert's project site must be arranged as & when possible.
4. The Mini Project or Internship (4 - 6 weeks) conducted during semester break after VI semester will be assessed during VII semester.
5. Project work is to be identified during VI semester, Initiated in VII semester (KCE 753) and completed in VIII semester (KCE 851).

EIGHTH SEMESTER

CIVIL ENGINEERING

SESSION 2021-22

CIVIL ENGINEERING

5. Guidelines for Management and Handling of Hazardous wastes MOEF (1991), Govt. of India.
6. Datta, M; Waste Disposal in Engineered Land fills, Narosa Publishers, Delhi.
7. Waste Management "Asian and Pacific Center for Transfer of Technology (N.D.) India", September 1993.
8. Solid and Hazardous Waste Management: Science and Engineering by M.N. Rao, Razia Sultana & Sri Harsha Kota
9. E-Waste Management: From Waste to Resource by Ramzy Kahhat, Klaus Hieronymi, Eric Williams.
10. Biomedical Waste Management by R. Radhakrishnan
11. Electronic Waste Management (Issues in Environmental Science and Technology) by R. E. Hester, R. M. Harrison & Martin T. Goosey

CIVIL ENGINEERING

KCE074	Solid Waste Management	3L:0T:0P	3Credits
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Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Understand the concept of solid waste management.
2. Explain handling and processing of solid waste.
3. Apply the concept of landfilling for disposal of solid waste.
4. Design composting and other solid waste conversion units.
5. Understand the various hazardous waste, risk assessment and legislation

Unit	Topics	Lectures
I	Solid waste: Public health and ecological impacts, Sources and types of solid wastes, material flow and waste generation, Functional elements: Waste generation, storage, collection, Transfer and transport, processing and recovery, disposal. Physical and chemical composition of municipal solid waste, integrated solid waste management, hierarchy of waste management options, different methods for generation rates. Storage: movable bins, fixed bins. Collection: home to home collection, community bin system. Theory and design of hauled container system, stationary container system.	8
II	Transportation: handcart, tri-cycle, animal cart, tripper truck, dumper placer, bulk refuse carrier, railroad transport, water transport, conveyors, layout of routes. Engineering system for on-site handling and processing of solid waste: separators, size reduction equipments, screening equipments, densification, baling, cubing, pelleting equipments.	8
III	Land filling: Site selection criteria, landfill layout, landfill sections, Occurrence of gases and leachate in landfills: composition and characteristics, generation factors, initial adjustment phase, transition phase, acid formation phase, methane formation phase, maturation phase of gases and leachate, Introduction to engineered landfills.	8
IV	Composting, types of composting, process description, design and operational consideration of aerobic composting, process description, design and operational consideration of anaerobic composting. Thermal conversion technologies: incineration and pyrolysis system, energy recovery, system. Overview of solid waste management practices in India.	8
V	Introduction to Hazardous wastes, Definition of Hazardous waste, The magnitude of the problem; Hazardous waste: Risk assessment, Environmental legislation, Characterization and site assessment, Waste minimization and resource recovery, Transportation of hazardous waste, Disposal of hazardous waste. Introduction to Electronic waste and Biomedical waste and their disposal.	8

References

1. Tchobanoglous, G., Theisen, H., & Vigil, S.A; Integrated Solid Waste Management: McGraw Hill, New York
2. Solid Waste Engineering, Principle & Management issues by Ven Te Chow
3. Bhide, A.D., B.B. Sundaresan, Solid Waste Management in developing countries.
4. Manual on Municipal solid Waste Management, CPHEEO, Govt. of India.

2020-21
KNC 602 CE

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**DR. A.P.J ABDUL KALAM TECHNICAL
UNIVERSITY, LUCKNOW**



**EVALUATION SCHEME & SYLLABUS
FOR
B. TECH. THIRD YEAR
(CIVIL ENGINEERING)**

(Effective from session 2020-21)

SIXTH SEMESTER

CIVIL ENGINEERING

SESSION 2020-21

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KCE 601	Design of Concrete Structures	3	1	0	30	20	50		100		150	4
2	KCE 602	Transportation Engineering	3	1	0	30	20	50		100		150	4
3	KCE 603	Environmental Engineering	3	1	0	30	20	50		100		150	4
4		Departmental Elective-III	3	0	0	30	20	50		100		150	3
	KCE 061	Advance Structural Analysis											
	KCE 062	River Engineering											
	KCE 063	Repair and Rehabilitation of Structures											
	KCE 064	Foundation Engineering											
5		Open Elective-I	3	0	0	30	20	50		100		150	3
	KCE 651	Transportation Engineering Lab	0	0	2				25		25	50	1
7	KCE 652	Environmental Engineering Lab	0	0	2				25		25	50	1
8	KCE 653	Structural Detailing Lab	0	0	2				25		25	50	1
9	NC*	Essence of Indian Traditional Knowledge/Constitution of India	2	0	0	15	10	25		50			
10		MOOCs (Essential for Hons. Degree)											
		Total	17	3	6							900	21

NOTE:

1. Regular classroom interaction with industry experts is to be ensured in all theory courses (minimum two expert talks from relevant Industry).
2. Working on experiments using virtual labs is to be ensured in lab courses.
3. Student's visit to Industry/Industry Expert's project site must be arranged as & when possible.

Course Outcomes:**After completion of the course student will be able to:**

- CO-1 Assess water demand and optimal size of water mains.
- CO-2 Layout the distribution system & assess the capacity of reservoir.
- CO-3 Investigate physical, chemical & biological parameter of water.
- CO-4 Design treatment units for water and waste water.
- CO-5 Apply emerging technologies for treatment of waste water.

Unit 1

Fresh water, water demands, variation in demands, population forecasting by various methods, basic needs and factors affecting consumption, design period.

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control. [8]

Unit 2

Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, Concept of service and balancing reservoirs.

Capacity of distribution reservoirs: general design guidelines for distribution system. [8]

Unit 3

Physical, chemical and bacteriological examination of water and wastewater: Temperature, pH, colour and odour, solids, nitrogen and phosphorus, chlorides, toxic metals and compounds, BOD, COD etc. quality requirements, standards of water and waste water, disposal of wastewater on land and water bodies. [8]

Unit 4

Objectives of water treatment: unit operations, processes, and flow sheets.

Water treatment: screening, sedimentation, determination of settling velocity, efficiency of ideal sedimentation tank, design of settling tanks, grit chamber.

Primary sedimentation and coagulation, filtration: theory of filtration; hydraulics of filtration; slow sand, rapid sand and pressure filters, backwashing; design of slow and rapid sand filters.

Disinfection: requirements of an ideal disinfectant; various disinfectants, chlorination and practices of chlorination, water softening and ion-exchange process [8]

Unit 5

Objectives of waste water treatment: unit operations, processes, and flow sheets.

Secondary and tertiary treatment: secondary sedimentation and theory of organic matter removal. Working of activated sludge process, trickling filters; aerated lagoons, waste stabilization ponds, oxidation ditches, rotating biological contactors (RBC).

Anaerobic digestion of sludge: design of low and high rate anaerobic digesters and septic tank. Working of up flow anaerobic sludge blanket (UASB) reactor and other emerging technologies for wastewater treatment

[8]

Text Books:

1. Peavy, Howard S., Rowe, Donald R and Tchobanoglous, George, "Environmental Engineering" McGraw Hill Education (India) Pvt. Ltd., New Delhi.
2. Metcalf & Eddy "Wastewater Engineering: Treatment & Reuse", Tata Mc-Graw Hill.
3. Garg, S.K.: Water Supply Engineering (Environmental Engineering Vol. – I)
4. Garg, S.K.: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol.–II).
4. Garg: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).
5. Davis, M.L. & Cornwell, D.A.: Introduction to Environmental Engineering, Mc-Graw Hill.

References:

1. Manual on Water Supply and Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi
2. Manual on Sewerage and Sewage Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi
3. Steel and McGhee: Water Supply and Sewerage
4. Fair and Geyer: Water Supply and Wastewater Disposal
5. Hammer and Hammer Jr.: Water and Wastewater Technology
6. Raju: Water Supply and Wastewater Engineering
7. Rao: Textbook of Environmental Engineering
8. Davis and Cornwell: Introduction to Environmental Engineering
9. Kshirsagar: Water Supply and Treatment and Sewage Treatment Vol. I and II
10. Punmia: Water Supply and Wastewater Engineering Vol. I and II
11. Birdie: Water Supply and Sanitary Engineering
12. Ramalho: Introduction to Wastewater Treatment Processes
13. Davis Mackenzie L., Cornwell, David A., "Introduction to Environmental Engineering" McGraw Hill Education (India) Pvt. Ltd., New Delhi.
14. Birdie: Water Supply and Sanitary Engineering
15. Ramalho: Introduction to Wastewater Treatment Processes
16. Parker: Wastewater Systems Engineering

**DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH,
LUCKNOW**



EVALUATION SCHEME AND SYLLABI

For

B. Tech. 1ST Year
Common to All Branches
EXCEPT Agriculture Engineering and Biotechnology

Effective from the Session: 2022-23

DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY UTTAR PRADESH.
Sec-11, Jankipuram Vistar, Lucknow - 226031, Uttar Pradesh, India

B. Tech. First Year, Semester- II
(All Branches except Agriculture Engineering and Biotechnology)

SN	Subject Code	Subject Name	Type	Category	Period			Evaluation Scheme						Credit
								Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total	Cr	
								CT	TA					
					L	T	P							
1.	BAS202/ BAS201	Engineering Chemistry / Engineering Physics	T	BS	3	1	0	20	10	30	70	100	4	
2.	BAS203	Engineering Mathematics-II	T	BS	3	1	0	20	10	30	70	100	4	
3.	BEC201/ BEE201	Fundamentals of Electronics Engineering / Fundamentals of Electrical Engineering	T	ES	2	1	0	20	10	30	70	100	3	
4.	BME201/ BCS201	Fundamentals of Mechanical Engineering/ Programming for Problem Solving	T	ES	2	1	0	20	10	30	70	100	3	
5.	BAS205/ BAS204	Soft Skills / Environment and Ecology	T	HS/ BS	3	0	0	20	10	30	70	100	3	
6.	BAS252/ BAS251	Engineering Chemistry Lab / Engineering Physics Lab	P	BS	0	0	3	-	50	50	50	100	1	
7.	BEC251/ BEE251	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	P	ES	0	0	3	-	50	50	50	100	1	
8.	BAS255/ BCS251	English Language Lab / Programming for Problem Solving Lab	P	HS/ ES	0	0	3	-	50	50	50	100	1	
9.	BWS251/ BCE251	Workshop Practice Lab / Engineering Graphics & Design Lab	P	ES	0	1	3	-	50	50	50	100	2	
10.	BVA251/ BVA252	Sports and Yoga / NSS	P	VA	0	0	3		100	*100		*100	0	
					13	5	12+ 3*			350+ *100	550	900+ *100	22	

*Compulsory Qualifying Audit Course

Abbreviation Used:

- BS: Basic Science Course
- ES: Engineering Science Course
- HS: Humanities and Social Science Course
- VA: Value Added Course

Summer Internship (4-week) / NPTEL Course (4-week) during summer break after Semester-II and same will be assessed/evaluated in the Semester-III

BAS104 / BAS204: ENVIRONMENT AND ECOLOGY

Course Objectives:

1. Aims and objectives of environmental education emphasize the relationship between man and the environment and educate young people about the importance of nature and the environment.
2. Environmental education aims to **impart ecological knowledge** and promote environmentally conscious behavior towards nature.
3. It encourages young minds to take **responsibility for protecting** the natural environment protection through information and knowledge and to develop environmental awareness.
4. Incidentally, promoting awareness and a sense of respect for nature leads to a comprehensive understanding of the environment and a reasonable attitude towards protecting it.
5. The focus of environmental education is Awareness, Knowledge, Attitude, Skills, Capacity Building and Participation.

Topics	Contact Hours
Unit-1	8
<p>Environment: Definition, Types of Environment, Components of environment, Segments of environment, Scope and importance, Need for Public Awareness.</p> <p>Ecosystem: Definition, Types of ecosystem, Structure of ecosystem, Food Chain, Food Web, Ecological pyramid. Balance Ecosystem.</p> <p>Effects of Human Activities such as Food, Shelter, Housing, Agriculture, Industry, Mining, Transportation, Economic and Social security on Environment, Environment Impact Assessment, Sustainable Development.</p>	
Unit-2	8
<p>Natural Resources: Introduction, Classification.</p> <p>Water Resources; Availability, sources and Quality Aspects, Water Borne and Water Induced Diseases, Fluoride and arsenic Problems in Drinking Water.</p> <p>Mineral Resources; Material Cycles; Carbon, Nitrogen and Sulfur cycles.</p> <p>Energy Resources; Conventional and Non conventional Sources of Energy.</p> <p>Forest Resources; Availability, Depletion of Forests, Environment impact of forest depletion on society.</p>	
Unit-3	8
<p>Pollution and their Effects; Public Health Aspects of Environmental;</p> <p>Water Pollution, Air Pollution, Soil Pollution, Noise Pollution, Solid waste management.</p>	
Unit-4	8
<p>Current Environmental Issues of Importance; Global Warming, Green House Effects, Climate Change, Acid Rain, Ozone Layer Formation and Depletion, Population Growth and Automobile pollution, Burning of paddy straw.</p>	

Unit-5	8
Environmental Protection; Environmental Protection Act 1986, Initiatives by Non Governmental Organizations (NGO's), Human Human Population and the Environment: Population growth, Environmental Education, Women Education.	

Course Outcomes:

Upon completion of the course, the student will be able to:

	Course Outcomes	Bloom's Level
CO-1	Gain in-depth knowledge on natural processes that sustain life, and govern economy.	K2
CO-2	Estimate and Predict the consequences of human actions on the web of life, global economy and quality of human life.	K3
CO-3	Develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.	K4
CO-4	Acquire values and attitudes towards understanding complex environmental-economic social challenges, and participate actively in solving current environmental problems and preventing the future ones.	K3
CO-5	Adopt sustainability as a practice in life, society and industry.	K3

Reference Books:

1. Textbook of Environment and Ecology by Dave, Katewa & Singh, 2nd Edition, Cengage Learning India Pvt Ltd Delhi.
2. Environmental Studies by S Deswal, Dhanpat rai & Co.
3. Environmental Science by VK Ahluwalia, TERI
4. Environmental Studies by R Rajgopalan, Oxford University Press.
5. Environment & Ecology by Singh & Malviya, Acme Learning

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BIOTECHNOLOGY

DR. A.P.J. ABDUL KALAM TECHNICAL
UNIVERSITY, UTTAR PRADESH, LUCKNOW



EVALUATION SCHEME & SYLLABUS

FOR

B. TECH. FOURTH (IV) YEAR

BIOTECHNOLOGY

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session: 2021-22]

BIOTECHNOLOGY

B.Tech. VII Semester BIOTECHNOLOGY

SEMESTER- VII													
Sl. No.	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU701/ KHU702	HSMC -1 #/ HSMC-2 #	3	0	0	30	20	50		100		150	3
2	KBT-071-074	Departmental Elective-IV	3	0	0	30	20	50		100		150	3
3	KBT-075-078	Departmental Elective-V	3	0	0	30	20	50		100		150	3
4		Open Elective-II	3	0	0	30	20	50		100		150	3
5	KBT751X	LAB-1	0	0	2				25		25	50	1
6	KBT752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KBT753	Project I	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	12	0	12							850	18
*The Mini Project or internship (4 - 6 weeks) conducted during summer break after VI semester and will be assessed during VII semester.													
SEMESTER- VIII													
Sl. No.	Subject	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
	Codes		L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU801/ KHU802	HSMC- 2#/HSMC-1#	3	0	0	30	20	50		100		150	3
2		Open Elective-III	3	0	0	30	20	50		100		150	3
3		Open Elective-IV	3	0	0	30	20	50		100		150	3
4	KBT851	Project II	0	0	18				100		300	400	9
5		MOOCs (Essential for Hons. Degree)	9	0	18								
		Total										850	18

BIOTECHNOLOGY

SUBJECT CODE: KBT-075	COURSE TITLE: Biosafety, Bioethics, IPR & Patents
EXAM DURATION: 3 HOURS	SEMESTER : VII (ODD)
L: T: P :: 3:0:0 CREDITS: 3	PRE REQUISITES: Basic biology, GMO's and bioethics.
OBJECTIVE: <ul style="list-style-type: none"> • To learn about the IPR and its legal provisions and to know about the significance of biosafety in different system. • To learn about concepts of Patent, Copyright, Trademarks and related IP • To learn about patent system, biosafety regulatory framework and basics of bioethics 	
COURSE OUTCOME: After successful completion of the course the students will be able to: <ul style="list-style-type: none"> • Get an adequate knowledge on biosafety-regulatory framework for GMO's in India • Understand biosafety-regulatory framework for GMOS at international level • Identify the role bioethics in IPR • Disseminate knowledge on different tools of IPR o make students aware about current trends in IPRand Govt. supports in promoting IPR • Identify the role of Patent and Patent law 	

REFERENCE BOOKS:

S.N	NAME OF AUTHORS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1.	Beier, F.K., Crespi, R.S. and Straus, T. Biotechnology and Patent protection- Oxford and IBH Publishing Co. New Delhi.	2007
2.	Intellectual property rights and Bio-Technology (Biosafety and Bioethics), Anupam Singh, Ashwani Singh, NPH, New Delhi	2012
3.	Sasson A, Biotechnologies and Development, UNESCO Publications..	1988
4.	Regulatory Framework for GMOs in India, Ministry of Environment and Forest, Government of India, New Delhi	2006
5.	Cartagena Protocol on Biosafety , Ministry of Environment and Forest, Government of India, New Delhi	2006

BIOTECHNOLOGY

COURSE DETAILS: BIOSAFETY, BIOETHICS, IPR & PATENTS

S N	CONTANT	LECTURE
I.	BIOSAFETY-REGULATORY FRAMEWORK FOR GMOS IN INDIA Regulatory framework in India governing GMOS-Recombinant DNA Advisory Committee (RDAC), Institutional Biosafety Committee (IBC), Review Committee on Genetic Manipulation, Genetic Engineering Approval Committee (GEAC), State Biosafety Coordination Committee (SBCC), District Level Committee (DLC). Recombinant DNA Guidelines (1990), Revised Guidelines for Research in Transgenic Plants (1998), Seed Policy (2002), Prevention Food Adulteration Act (1955), The Food Safety and Standards Bill (2005), Plant Quarantine Order (2003), Regulation for Import of GM Products Under Foreign Trade Policy (2006-2007), National Environment Policy (2006). Rules for the manufacture, use/import/export and storage of hazardous microorganisms/genetically engineered organisms or cells (Ministry of Environment and Forests Notification, (1989)	8
II.	BIOSAFETY-REGULATORY FRAMEWORK FOR GMOS AT INTERNATIONAL LEVEL Convention of Biological Diversity (1992) – Cartagena Protocol on Biosafety – Objectives and salient features of Cartagena Protocol – Advanced Information Agreement (AIA) procedure – procedures for GMOs intended for direct use-risk assessment-risk management-handling, transport, packaging and identification of GMOs-Biosafety Clearing House-unintentional transboundary movement of GMOs-Benefits of becoming a party to the Cartagena Protocol- status of implementation in India.	8
III.	BIOETHICS Distinction among various forms of IPR, ,Prior art for a patent, Patenting live microorganism, Human Genome project and ethical issues, Animal cloning, human cloning and their ethical issues, Experimenting on animals. Public education of producing transgenic organism, legal and socioeconomic impacts of biotechnology, testing drugs on human volunteers, Hazardous materials used in biotechnology, their handling and disposal.	8
IV.	INTELLECTUAL PROPERTY RIGHTS Concept of property, rights, duties and Jurisprudential definition, Introduction to patent, copy right, trademarks, Design, geographical indication. History and evolution of IPR, Economic importance of IPR, Indian patent act 1970 (amendment 2000), Distinction among various forms of IPR, invention step, biopiracy and bioprospecting-Appropriate case studies. Infringement/violation of patent, remedies against infringement (civil, criminal, administrative)	8
V.	PATENTS AND PATENT LAWS Plant and Animal growers rights patents trade secrets, and plant genetic recourses GATT and TRIPS, Dunkels Draft Patenting of biological materials, Current Issues of Patents for higher animal and higher plants, patenting of transgenic organisms, isolated genes and DNA sequences..	8

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY LUCKNOW



STUDY, EVALUATION SCHEME & SYLLABUS

For

**B.TECH. 3RD YEAR
(BIOTECHNOLOGY)**

Based on

AICTE MODEL CURRICULUM

(EFFECTIVE FROM THE SESSION: 2020-21)

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW
B.TECH III YEAR V SEMESTER BIOTECHNOLOGY

		SEMESTER- V							SESSION2020-21				
Sl · No	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Cre dit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KBT 501	Genetic Engineering	3	1	0	30	20	50		100		150	4
2	KBT 502	Fermentation Biotechnology	3	1	0	30	20	50		100		150	4
3	KBT 503	Bioinformatics I	3	1	0	30	20	50		100		150	4
4	KBT 051-054	Departmental Elective-I	3	0	0	30	20	50		100		150	3
5	KBT 055-058	Departmental Elective-II	3	0	0	30	20	50		100		150	3
6	KBT 551	Genetic Engineering lab	0	0	2				25		25	50	1
7	KBT 552	Fermentation Technology Lab	0	0	2				25		25	50	1
8	KBT 553	Bioinformatics- I virtual lab	0	0	2				25		25	50	1
9		Mini Project or Internship Assessment*	0	0	2				50			50	1
10	KNC501/ KNC502	Constitution of India / Essence of Indian Traditional Knowledge	2	0	0	15	10	25		50			
11		MOOCs (Essential for Hons. Degree)											
		Total	17	3	8							950	22

*The Mini Project or internship (4 weeks) conducted during summer break after IV semester and will be assessed during V semester.

**DR. A.P. J ABDUL KALAM TECHNICAL UNIVERSITY,
LUCKNOW B.TECH. III YEAR V SEMESTER BIOTECHNOLOGY**

SUBJECT CODE: KBT 055	COURSE TITTLE: Biofuels & Alcohol Technology
EXAM DURATION: 3 HOURS	SEMESTER: V (ODD)
L: T: P :: 3 : 0: 0 CREDITS:3	PREREQUISITE: Basic knowledge of Fermentation and Bioconversion
OBJECTIVE: <ul style="list-style-type: none"> • To teach the concept and application biofuels and alcohol technology • To develop understanding different alcoholic fermentation techniques. • To provide knowledge Biochemistry of alcohol production, recycling and quality control. • Concepts of Biomass conversion to heat and power 	
COURSE OUTCOME: On completion of this course, the students will be able to: <ul style="list-style-type: none"> • Explain basic concepts of metabolism and importance of metabolic engineering • Understand the production of metabolites and its regulatory mechanism • Explain the applications, specificity and product inhibition of bioconversion. • Regulation of enzyme production and strain improvement 	

REFERENCE BOOKS:		
S. NO.	NAME OF AUTHORS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION/ REPRINT
1.	Chemical Process Principles – Part I, Material and Energy Balances by Olaf A Hougen, Kwenneth M. Watson, and Roland A Ragatz, CBS Publishers and Distributors (1995).	1995
2.	He alcohol text book by Kathryn AnnJacques, T. P. Lyons, D. R. Kelsall	2003
3.	Product Recovery in Bioprocess Technology ", BIOTOL Series, VCH, 1990	1990
4.	Shreve's Chemical Process Industries , 5th Ed. Reference	1984
5.	Out lines of Chemical Technology by Charles E. Dryden	1973

COURSE DETAILS: Biofuels & Alcohol Technology

UNITS	CONTENTS	LECTURE HOURS
I	Introduction to Alcohol Technology, Raw Material of Alcohol Industry, Storage & handling of Raw material in detail, Study of different yeast strains used in alcohol industries, Study of yeast production as single protein cell.	9
II	Study of different alcoholic fermentation techniques, Batch fermentation, Continuous fermentation, Modern techniques of Continuous fermentation, Bio still fermentation, Encillium process, Wet milling of grain for alcohol production, Grain dry milling cooking for alcohol production, Use of cellulosic feed stocks for alcohol production, Scaling in distilleries, Fusel oil separation	9
III	Study of different recycling process, Biochemistry of alcohol production, The management of fermentation in the production of alcohol. Alcohol distillation-The fundamental, Parameters & affecting alcoholic fermentations, By product of alcoholic fermentation, Distillery quality control, Alcoholometry	10
IV	Various biofuels/ bioenergy from biomass. Biomass conversion to heat and power: thermal gasification of biomass, anaerobic digestion. Biomass conversion to biofuel: thermochemical conversion, syngas fermentation.	10
		38

OPEN ELECTIVES II LIST 2021-22

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY
UTTAR PRADESH, LUCKNOW



EVALUATION SCHEME & SYLLABUS

FOR

OPEN ELECTIVES II LIST

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session:2021-22]

Note:

1. The Student shall choose an open Elective from the list in such a manner that he/she has not studied the same course in any form during the degree programme.
2. * It is mandatory that for these subjects (KOE069, KOE076, KOE087, KOE097 & KOE098) only Trained Faculty (who had done the FDP for these courses) will teach the courses.

OPEN ELECTIVES II LIST 2021-22

B.Tech. VII Semester (2021-22)

OPEN ELECTIVE-II

KOE071	FILTER DESIGN
KOE072	BIOECONOMICS
KOE073	MACHINE LEARNING
KOE074	RENEWABLE ENERGY RESOURCES
KOE075	OPERATIONS RESEARCH
KOE076	VALUE RELATIONSHIP & ETHICAL HUMAN CONDUCT- FOR A HAPPY & HARMONIOUS SOCIETY
KOE077	DESIGN THINKING
KOE078	SOIL AND WATER CONSERVATION ENGINEERING
KOE078	INTRODUCTION TO WOMEN'S AND GENDER STUDIES

CIVIL ENGINEERING

SEVENTH SEMESTER

CIVIL ENGINEERING

SESSION 2021-22

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU701/ KHU702	HSMC-1*/HSMC-2*	3	0	0	30	20	50		100		150	3
2		Departmental Elective -IV	3	0	0	30	20	50		100		150	3
	KCE 070	Railway, Waterway and Airway Engineering											
	KCE 071	Sustainable Construction Methods											
	KCE 072	Probability Methods in Civil Engineering											
	KCE 073	Advance Concrete Design											
	KCE 074	Solid Waste Management											
3		Departmental Elective -V	3	0	0	30	20	50		100		150	3
	KCE 075	Design of Steel Structures											
	KCE 076	Urban Transportation Planning											
	KCE 077	Geosynthetics and Reinforced Soil Structures											
	KCE 078	Irrigation and Water Resource Engineering											
	KCE 079	Disaster Preparedness and Management											
4		Open Elective-II	3	0	0	30	20	50		100		150	3
5	KCE751	Concrete Lab	0	0	2				25		25	50	1
6	KCE752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KCE753	Project	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	12	0	12							850	18

NOTE:

1. Regular classroom interaction with industry experts is to be ensured in all theory courses (minimum two expert talks from relevant Industry).
2. Working on experiments using virtual labs is to be ensured in lab courses.
3. Student's visit to Industry/Industry Expert's project site must be arranged as & when possible.
4. The Mini Project or Internship (4 - 6 weeks) conducted during semester break after VI semester will be assessed during VII semester.
5. Project work is to be identified during VI semester, Initiated in VII semester (KCE 753) and completed in VIII semester (KCE 851).

EIGHTH SEMESTER

CIVIL ENGINEERING

SESSION 2021-22

OPEN ELECTIVES II LIST 2021-22

KOE-074	RENEWABLE ENERGY RESOURCES	3L:0T:0P	3 Credits
Unit	Topics	Lectures	
I	Introduction: Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits. Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar cell power plant, limitations.	8	
II	Solar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focussing of collectors and their materials, applications and performance; solar thermal power plants, thermal energystorage for solar heating and cooling, limitations.	8	
III	Geothermal Energy: Resources of geothermal energy, thermodynamics of geo- thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations. Magneto-hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations. Cells: Principle of working of various types of fuel cells and their working, performance and limitations.	8	
IV	Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations. Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. Performance and limitations of energy conversion systems.	8	
V	Bio-mass: Availability of bio-mass and its conversion theory. Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants.	8	

Text Book:

1. Raja etal, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
3. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications,2006.
4. D.S. Chauhan,"Non-conventional Energy Resources" New Age International.
5. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
6. Peter Auer, "Advances in Energy System and Technology". Vol. 1 & II Edited by Academic Press.
7. Godfrey Boyle," Renewable Energy Power For A Sustainable Future", Oxford University Press.