

INDEX

Criterion No: 1.3.1

Criterion Details: Institution integrates crosscutting issues relevant to professional ethics, gender, human values, environment and sustainability into the curriculum

S.NO.	SUBJECTS	CODE	SEMESTER	DEPARTMENT
1.	Environmental studies (Group A)	AHT004	I	B. Tech Ist Yr
2.	Environmental studies (Group B)	AHT004	II	B. Tech Ist Yr
3.	Energy and Environmental Engineering	BCET-301	III	CSE
4.	Energy and Environmental Engineering	BCET301	III	EEE
5.	Energy and Environmental Engineering	BCET301	III	ECE
6.	Energy and Environmental Engineering	BCET301	III	CE
7.	Energy and Environmental Engineering	BCET301	III	ME
8.	Universal Human Values	BHUT-401	IV	CSE
9.	Universal Human Values	BHUT-401	IV	EEE
10.	Universal Human Values	BHUT-401	IV	ECE
11.	Universal Human Values	BHUT-401	IV	ME
12.	Universal Human Values	BHUT-401	IV	CE
13.	Environmental Impact Assessment	BCET-504	V	CE
14.	Renewable Energy	BOEC-505	V	CE
15.	Environmental Engineering-I	BCET-602	VI	CE
16.	Cost Effective and Eco-Friendly Structure	BCET-604	VI	CE
17.	Environmental Management and Sustainability	BCET-605	VI	CE
18.	Renewable Energy technology	BMET-605	VI	ME
19.	Environmental Engineering-II	BCET-701	VII	CE
20.	Energy Conservation	BMET -704	VII	ME
21.	Solar Energy	BMET-803	VIII	ME

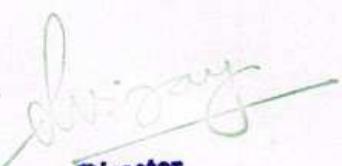
22.	Environment and Ecology	BMET-804	VIII	ME
23.	Human Values & Ethics	BSAN-111	I	B.Sc. Agriculture
24.	Environmental Studies & Disaster Management	BSAC -307	III	B.Sc. Agriculture
25.	Renewable Energy & Green Technology	BSAC-403	IV	B.Sc. Agriculture
26.	Environmental Studies	BCH-1.1	I	B. Com (Hons.)
27.	Environmental Science	BBA-206	IV	BBA
28.	Universal Human Values	MCAT- 306	III	MCA
29.	Environment Management	MAM-102	I	MBA

1.3 - Curriculum Enrichment

1.3.1 - Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

A range of papers and modules are available for both UG and PG degrees that address gender, environment, values, and ethics. The UG curriculum cover contemporary subjects including secularism, human rights, ecology, feminism, diaspora, refugeeism, and environmental conservation in courses like English, Environment, and Human Values. These courses have a strong emphasis on topics including ethics, the environment, and gender. The core values of Indian culture are included in the universal human principles statement, with special emphasis placed on values like honesty, non-violence, tolerance, and maintaining harmony in all spheres of one's life—individually, within one's family and society, and with the natural world. Communities and people are made more aware of the value of protecting and conserving nature through environmental education. In addition, the curriculum offers semester-long specialist courses in areas such as corporate etiquette, human rights, nationalism, gender studies, queer literature, feminist criticism, civic awareness, and econometrics.

Encouraging female students to participate in committees and extracurricular activities is a proactive way to address gender sensitivity. programs created especially to give female students and faculty members more power on campus. With a focus on moral and value education, the institution provides instruction, training programs, and announcements to all students. Additionally, increasing students' understanding of social and legal issues is a major goal of the NCC and NSS modules.



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Tula's Institute, Dehradun

Environmental studies AHT004
(Group A)



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[B. Tech. Model Curriculum Structure]

S. No.	Subject Codes	Subject Name	Periods				Sessional Exam			ESE		Subject Total	Credit
			L	T	P	CT	TA	Total	TE	PE			
1		First 3 Weeks Mandatory Induction Program for all B. Tech. I Year Students beyond class hours											
2	AHT-001/ AHT-002	Engineering Physics/ Engineering Chemistry	3	1	0	30	20	50	100			150	4
3	AHT-003	Introduction to Engineering Mathematics	3	1	0	30	20	50	100			150	4
4	EET-001/ ECT-001	Basic Electrical Engineering/ Basic Electronics Engineering	3	1	0	30	20	50	100			150	4
5	CST-001/ MET-001	Programming for Problem Solving/ Basic Mechanical Engineering	3	1	0	30	20	50	100			150	4
6	AHP-001/ AHP-002	Engineering Physics Lab/ Engineering Chemistry Lab	0	0	2			25	25			25	50
7	EEP-001/ ECP-001	Basic Electrical Engineering Lab/ Basic Electronics Engineering Lab	0	0	2			25	25			25	50
8	CSP-001/ MEP-001	Programming for Problem Solving Lab/Basic Mechanical Engineering Lab	0	0	2			25	25			25	50
9	MEP-002/ MEP-003	Engineering Graphics & Design Lab/ Workshop Practices Lab	0	1	2			50	50			50	100
10	AHP-003/ AHP-004	Introduction to Digital Marketing/ Emerging Technologies in Engineering	0	0	2			25	25			25	50
11	AHP-005/ CSP-002	Self Employment and Entrepreneurship Development/ Computer Applications and IOT	0	0	2			25	25			25	50
12	AHT-004/ AHP-006	Environmental Studies / English Language Lab	2	0	0	15	10	25	50			75	
13	GP-01	General Proficiency							50			50	
14		Internship-I /Mini Project - I	3-4 Weeks internship to be completed at the end of first or second semester during vacation period and its evaluation/ credit to be added in third semester of relevant branch.										
		Total										950	23
		*BRIDGE COURSE FOR B Tech Biotechnology											
	AHT000	• Basic Mathematics (for bio students)	2	1	0	30	20	50	100			150	0
	BTT001	• Biology for engineers (for math's students)	2	1	0	30	20	50	100			150	0

Abbreviations: L-No. of Lecture hours per week, T-No. of Tutorial hours per week, P-No. of Practical hours per week,

CT-Class Test Marks, TA-Marks of teacher's assessment including student's class performance and attendance,

PS-Practical Sessional Marks, ESE-End Semester Examination, TE- Theory Examination Marks,

PE- Practical External Examination Marks

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Syllabus Environmental Studies (AHT-004)

L:T:P:: 2:0:0

Credits-0

- Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit II :Ecosystems:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:-
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit III: Biodiversity and Conservation

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographically classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit IV: Environmental Pollution

Definition

- Cause, effects and control measures of:-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.

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**Syllabus
Environmental Studies (AHT-004)**

L:T:P:: 2:0:0

Credits-0

- Pollution casestudies.
- Disaster management : floods, earthquake, cyclone and landslides.

UNIT V - Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people: its problems and concerns. Case Studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

UNIT VI - Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies. (6 lectures)

Note: Introduction and familiarize students with the following

Global Environmental Issues and Environmental Laws

Pollution Tragedies: Love canal, Bhopal Gas, Endosulfan, Minamata and Flint water. UN Initiatives and International agreements: Montreal and Kyoto protocols, Paris Climate Summit (2015) and Convention on Biological Diversity (CBD). Environment Laws: Environment Protection Act (1986); Air (Prevention & Control of Pollution) Act (1981); Forest

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Syllabus Environmental Studies (AHT-004)

L:T:P:: 2:0:0

Credits-0

Conservation Act (1980); Water (Prevention and control of Pollution) Act (1974); Wildlife Protection Act (1972).

Field work

1. Visit to a local area to document environmental assets river / forest / grassland / hill /mountain
2. Visit to a local polluted site-Urban / Rural / Industrial /Agricultural
3. Study of common plants, insects,birds.
4. Study of simple ecosystems-pond, river, hill slopes,etc.
5. Plantation at least 2 fruits tree in Surroundings. Pic is taken.
6. Any useful daily good from wastematerials.
7. Taken at least 5 pics of surrounding by mobile in relation to environmental/socialissues.
8. Development of detailed list of flora and fauna of collegecampus.
9. Manufacturing of any technical prototype/model in relation to Climatic Changemitigation.

Note: Minimum Five activities shall be done by each class and reports shall submit to institute after verification of department

Text Books:

1. Basu, M. and Xavier, S.,Fundamentals of Environmental Studies, Cambridge University Press, 2016.
2. Mitra, A. K and Chakraborty, R., Introduction to Environmental Studies, Book Syndicate,2016.
3. Enger, E. and Smith, B., Environmental Science: A Study of Interrelationships, Publisher: McGraw-Hill Higher Education; 12th edition,2010.
4. Basu, R.N, Environment, University of Calcutta,2000.

Suggested Readings:

1. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia:Saunders.
2. Pepper, I.L., Gerba, C.P. &Brusseau, M.L. 2011. Environmental and Pollution Science. AcademicPress.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment,London,Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ.Press.
5. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
6. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). ZedBooks.
7. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the TwentiethCentury.
8. Ghosh Roy, MK, Sustainable Development (Environment, Energy and Water Resources), Ane Books Pvt. Ltd.,2011.



**Syllabus
Environmental Studies (AHT-004)**

L:T:P:: 2:0:0

Credits-0

9. Karpagam, M and GeethaJaikumar, Green Management, Theory and Applications, Ane Books Pvt. Ltd.,2010.
10. BalaKrishnamoorthy, Environmental Management, PHI learning PVT Ltd,2012.

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Environmental studies

AHT004



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[B. Tech. Model Curriculum Structure]

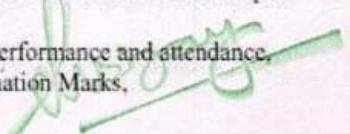
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			Periods			Sessional Exam			ESE			
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2	AHT-005	Analytical Mathematics	3	1	0	30	20	50	100		150	4
3	ECT-001/ EET-001	Basic Electronics Engineering/ Basic Electrical Engineering	3	1	0	30	20	50	100		150	4
4	MET-001/ CST-001	Basic Mechanical Engineering/ Programming for Problem Solving	3	1	0	30	20	50	100		150	4
5	AHP-002/ AHP-001	Engineering Chemistry Lab/ Engineering Physics Lab	0	0	2			25	25		25	50
6	ECP-001/ EEP-001	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	0	0	2			25	25		25	50
7	MEP-001/ CSP-001	Basic Mechanical Engineering Lab/ Programming for Problem Solving Lab	0	0	2			25	25		25	50
8	MEP-003/ MEP-002	Workshop Practices/ Engineering Graphics & Design Lab	0	1	2			50	50		50	100
9	AHP-004/ AHP-003	Emerging Technologies in Engineering/ Introduction to Digital Marketing	0	0	2			25	25		25	50
10	CSP-002/ AHP-005	Computer Applications and IOT/ Self Employment and Entrepreneurship Development	0	0	2			25	25		25	50
11	AHP-006/ AHT-004	English Language Lab/ Environmental Studies	0	0	2			50		25	75	
12	GP-02	General Proficiency						50			50	
13		Internship-I /Mini Project-I	3-4 Weeks internship to be completed at the end of first or second semester during vacation period and its evaluation/ credit to be added in third semester of relevant branch.									
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Syllabus Environmental Studies (AHT-004)

L:T:P:: 2:0:0

Credits-0

Course Objectives:

The aim of E.V.S. (environmental studies) is to develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge ,Skills, attitudes ,motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones. In view of this aim, environmental studies should form an integral part of the educational process, be centered in practical problems and be of an interdisciplinary/multidisciplinary character.

OBJECTIVES of Environmental Studies Subject

- Awareness: To help social groups and individuals acquire awareness of and sensitivity to the total environment and it's allied problems.
- Knowledge: To help social groups and individuals gain a variety of experiences and acquire a basic understanding of environment and it's associated problems.
- Attitudes: To help social groups and individuals acquire a set of values and feelings of concern for environment.
- Skills: To help the individuals in acquiring skills for identifying and solving environmental problems.
- Participation: To provide social groups and individuals with an opportunity to be actively involved at all levels in working towards the resolution of environmental problems.

Detailed Content

Unit I –

Introduction: Introduction to environmental studies, Multidisciplinary nature of environmental studies; Scope and importance; the need for environmental education. Concept of sustainability and sustainable development.

Natural Resources:

- Renewable and non-renewable resources: Natural resources and associated problems.
- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources : Growing energy needs, renewable and non renewable energy sources, use alternate energy sources. Case studies.

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Syllabus Environmental Studies (AHT-004)

L:T:P:: 2:0:0

Credits-0

- Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit II :Ecosystems:

- Concept of an ecosystem.
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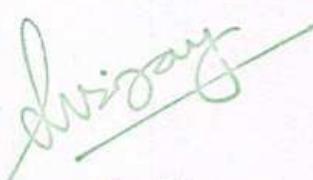
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- Introduction – Definition : genetic, species and ecosystem diversity.
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Syllabus Environmental Studies (AHT-004)

L:T:P:: 2:0:0

Credits-0

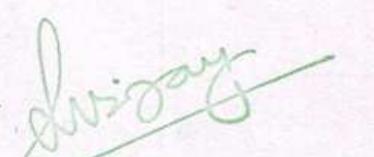
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- Environmental ethics: Issues and possiblesolutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
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- Consumerism and wasteproducts.
- Environment Protection Act.
- Air (Prevention and Control of Pollution)Act.
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- Wildlife ProtectionAct
- Forest Conservation Act
- Issues involved in enforcement of environmentallegislation.
- Publicawareness.

UNIT VI - Human Population and the Environment

- Population growth, variation amongnations.
- Population explosion – Family WelfareProgramme.
- Environment and human health.
- HumanRights.
- ValueEducation.
- HIV/AIDS.
- Women and ChildWelfare.
- Role of Information Technology in Environment and humanhealth.
- Case Studies. (6lectures)



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Syllabus Environmental Studies (AHT-004)

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Note: Minimum Five activities shall be done by each class and reports shall submit to institute after verification of department

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 7. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
 8. Ghosh Roy, MK, Sustainable Development (Environment, Energy and Water Resources) Ane Books Pvt. Ltd.,2011.
- Signature*
Director
Tula's Institute, Dehradun



**Syllabus
Environmental Studies (AHT-004)**

L:T:P:: 2:0:0

Credits-0

9. Karpagam, M and GeethaJaikumar, Green Management, Theory and Applications, Ane Books Pvt. Ltd.,2010.
10. BalaKrishnamoorthy, Environmental Management, PHI learning PVT Ltd,2012.

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[Computer Science and Engineering]
W.E.F. Academic Session 2020-21

III Semester

IV Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BAST 401	ESC	Mathematics- III	100	30	20	-	-	150	3	1	-	4	
2.	BECT 402	DC	Database Management Systems	100	30	20	30	20	200	3	1	2	5	
3.	BECT 403	DC	Software Engineering	100	30	20	30	20	200	3	-	2	4	
4.	BEET 404	DC	Computer Org. & Architecture	100	30	20	30	20	200	3	1	2	5	
5.	BEET 404	DC	Theory of Automata and Formal Languages	100	30	20	-	-	150	3	1	0	4	
6.	BHUT401	HV	Universal Human Values-2	50	30	20	-	-	100	2	1	0	3	
	BCST 408	MC	Cyber Security and software tools											
7	BECP 407	DLC	90 hrs Internship based on using various software's -Internship -II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				550	180	120	90	60	1000	17	5	6	25	
NSS/NCC				Director										

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Semester -III

BCET 301	Energy and Environmental Engineering	3L:1T:0P	4 Credits
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Course Objectives:

The objective of this course is to apply knowledge of mathematics, science, technology and engineering appropriate to energy science and engineering degree discipline and to enhance the understanding of conventional and non-conventional energy sources and its relationship with the ecology and environment. More precisely the objectives are:

1. Use mathematical or experimental tools and techniques relevant to the energy and energy-related environmental disciplines along with an understanding of their processes and limitations.
2. Equip the students with knowledge and understanding of various possible mechanisms about renewable energy projects
3. To produce graduates strong in understanding on energy resources, technologies and systems, energy management fundamentals, and capable in innovative technological intervention towards the present and potential future energy.
4. To identify, formulate and solve energy and energy-related environmental problems by pursuing development of innovative technologies that can generate clean and sustainable energy to address energy scarcity and combat pollution and climate change.

Course Outcomes

1. Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering.
2. Distinguish the different energy generation systems and their environmental impacts.
3. Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.

Detailed Content

Unit I:

Introduction to Energy Science - Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment, Global Energy Scenario: Role of energy in economic development. Indian Energy Scenario: Introduction to Energy resources & Consumption in India. Common terminologies

Unit II

Energy Sources - Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sun as Source of Energy, Availability of Solar Energy, Nature of Solar Energy, Solar Energy & Environment. Various Methods of using solar energy. Commercial and noncommercial forms of energy, Fossil fuels, Renewable sources including: Nuclear Energy, Hydel Energy, Storage of Hydrogen, Hydrogen Production, Hydrogen Energy Geothermal, Tide and Wave Energy, Bio-fuels in India.

Unit III

Energy Efficiency and Conservation - Introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental

outcomes; How future energy use can be influenced by economic, environmental, trade, and Research policy.

Unit IV

Energy & Environment - Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession. Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , solid waste Management.

Unit V

Environmental Protection and Ethics - Environmental Protection- Role of Government Initiatives by Non-governmental Organizations (NGO) Environmental Education. Ethics and moral values Objectives of ethics, Professional and Non- professional ethics Sustainable Development of the ecology and environment Codes of ethics and their limitations

Suggested reading material:

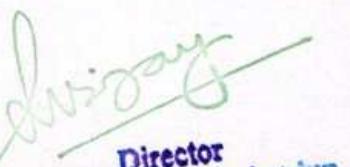
1. Schaeffer, John. 2007. Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living (30th anniversary edition). Gaiam.
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Divyanshu
Director
Tula's Institute, Dehradun

Semester III

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted						Contact Hours					
				Theory			Practical								
				End Sem.	Mid Sem.	Quiz/ Assign ment	End Sem.	Term work Lab Work & Sessional		L	T	P			
1.	BCET 301	ES	Energy & Environmental Engineering	100	30	20	-	-	150	3	-	-	3		
2.	BEST 301	BSC	Mathematics-III	100	30	20			150	3	1	-	4		
3.	BEET 301 BEEP 301	DC	Electrical Measurements & Instrumentation	100	30	20	30	20	200	3	1	2	5		
4.	BECT 304 BECP 304	DC	Electronic Devices	100	30	20	30	20	200	3	0	2	4		
5.	BEET 305 BEEP 305	DC	Networks Analysis and Synthesis	100	30	20	30	20	200	3	1	2	5		
6.	BEEP 306	DC	Programming Practices	-	-	-	30	20	50	-	-	2	1		
7.	BASP 307		Evaluation of Internship-I Completed at 1 year level/Seminar Presentation for Internship					50	50			2	1		
8.	BASP 307	DLC	90 hrs Internship based on using	To be completed anytime during fourth semester. Its evaluation/credit to be added in fifth semester.											
Total				500	150	100	90	160	1000	15	3	8	23		
9.	BC	MC	Cyber Security	Non-credit course											
			NSS/NCC												

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



Director
Tula's Institute, Dehradun

Course Objectives:

The objective of this course is to apply knowledge of mathematics, science, technology and engineering appropriate to energy science and engineering degree discipline and to enhance the understanding of conventional and non-conventional energy sources and its relationship with the ecology and environment. More precisely the objectives are:

1. Use mathematical or experimental tools and techniques relevant to the energy and energy-related environmental disciplines along with an understanding of their processes and limitations.
2. Equip the students with knowledge and understanding of various possible mechanisms about renewable energy projects
3. To produce graduates strong in understanding on energy resources, technologies and systems, energy management fundamentals, and capable in innovative technological intervention towards the present and potential future energy.
4. To identify, formulate and solve energy and energy-related environmental problems by pursuing development of innovative technologies that can generate clean and sustainable energy to address energy scarcity and combat pollution and climate change.

Course Outcomes

1. Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering.
2. Distinguish the different energy generation systems and their environmental impacts.
3. Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.

Detailed Content**Unit I:**

Introduction to Energy Science - Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment, Global Energy Scenario: Role of energy in economic development. Indian Energy Scenario: Introduction to Energy resources & Consumption in India. Common terminologies

Unit II

Energy Sources - Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sun as Source of Energy, Availability of Solar Energy, Nature of Solar Energy, Solar Energy & Environment. Various Methods of using solar energy. Commercial and noncommercial forms of energy, Fossil fuels, Renewable sources including: Nuclear Energy, Hydel Energy, Storage of Hydrogen, Hydrogen Production, Hydrogen Energy Geothermal, Tide and Wave Energy, Bio-fuels in India.

Unit III

Energy Efficiency and Conservation - Introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental

outcomes; How future energy use can be influenced by economic, environmental, trade, and Research policy.

Unit IV

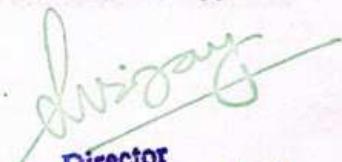
Energy & Environment - Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession. Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , solid waste Management.

Unit V

Environmental Protection and Ethics - Environmental Protection- Role of Government Initiatives by Non-governmental Organizations (NGO) Environmental Education. Ethics and moral values Objectives of ethics, Professional and Non- professional ethics Sustainable Development of the ecology and environment Codes of ethics and their limitations

Suggested reading material:

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Director
Tula's Institute, Dehradun

New Scheme of Examination as per AICTE Flexible Curricula
Bachelor of Technology (B.Tech.) III Year
[Electronics and Communication Engineering]
W.E.F. Academic Session 2020-21

III Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BCET 301	BSC-5	Mathematics-III	100	30	20	--	--	150	3	1	0	4	
2.	BECT 302	DC-1 BECP 302	Electronic Measurement & Instrumentation	100	30	20	30	20	200	3	1	2	5	
3.	BECT 303	DC-2 BECP 303	Digital Electronics	100	30	20	30	20	200	3	1	2	5	
4.	BECT 304	DC-3 BECP 304	Electronic Devices	100	30	20	30	20	200	3	1	2	5	
5.	BEET 305	DC-4 BEEP 305	Network Analysis & Synthesis	100	30	20	30	20	200	3	1	2	5	
6.	BASP 307	DLC-1	Evaluation of Internship-I completed at 1 year level /Seminar for Lateral Entry	-	-	-	-	50	50		4		2	
7		HV	90 hrs Internship based on using various software's -Internship-II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				500	150	100	120	130	1000	15	5	12	26	
NSS/NCC														

IV Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BAST 401	ESC	Energy & Environmental Engineering	100	30	20	-	-	150	3	1	-	4	
2.	BECT 402	DC	Signal & Systems	100	30	20			150	3	1	-	4	
3.	BECT 403	DC	Analog Communication	100	30	20	30	20	200	3	1	2	5	
4.	BEET 404	DC	Control System	100	30	20	30	20	200	3	1	2	5	
5.	BECT 405	DC	Analog Circuits	100	30	20	30	20	200	3	1	2	5	
6.	BHUT-401	HV	Universal Human Value -2	50	30	20	-	-	100	2	1	0	3	
	BCST 408	MC	Cyber Security and PCB Design Software Simulation											
7		DLC	90 hrs Internship based on using various software's -Internship-II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				550	180	120	90	60	1000	17	6	6	26	
NSS/NCC														

Divyanshu
Director
Tula's Institute, Dehradun

Course Objectives:

The objective of this course is to apply knowledge of mathematics, science, technology and engineering appropriate to energy science and engineering degree discipline and to enhance the understanding of conventional and non-conventional energy sources and its relationship with the ecology and environment. More precisely the objectives are:

1. Use mathematical or experimental tools and techniques relevant to the energy and energy-related environmental disciplines along with an understanding of their processes and limitations.
2. Equip the students with knowledge and understanding of various possible mechanisms about renewable energy projects
3. To produce graduates strong in understanding on energy resources, technologies and systems, energy management fundamentals, and capable in innovative technological intervention towards the present and potential future energy.
4. To identify, formulate and solve energy and energy-related environmental problems by pursuing development of innovative technologies that can generate clean and sustainable energy to address energy scarcity and combat pollution and climate change.

Course Outcomes

1. Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering.
2. Distinguish the different energy generation systems and their environmental impacts.
3. Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.

Detailed Content**Unit I:**

Introduction to Energy Science - Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment, Global Energy Scenario: Role of energy in economic development. Indian Energy Scenario: Introduction to Energy resources & Consumption in India. Common terminologies

Unit II

Energy Sources - Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sun as Source of Energy, Availability of Solar Energy, Nature of Solar Energy, Solar Energy & Environment. Various Methods of using solar energy. Commercial and noncommercial forms of energy, Fossil fuels, Renewable sources including: Nuclear Energy, Hydel Energy, Storage of Hydrogen, Hydrogen Production, Hydrogen Energy Geothermal, Tide and Wave Energy, Bio-fuels in India.

Unit III

Energy Efficiency and Conservation - Introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental

outcomes; How future energy use can be influenced by economic, environmental, trade, and Research policy.

Unit IV

Energy & Environment - Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession. Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , solid waste Management.

Unit V

Environmental Protection and Ethics - Environmental Protection- Role of Government Initiatives by Non-governmental Organizations (NGO) Environmental Education. Ethics and moral values Objectives of ethics, Professional and Non- professional ethics Sustainable Development of the ecology and environment Codes of ethics and their limitations

Suggested reading material:

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Uttarakhand Technical University, Dehradun
Scheme of Examination as per AICTE Flexible Curricula
Evaluation Scheme & Syllabus for B. Tech Second Year
W.E.F. Academic Session 2019-20
II Year (III SEMESTER) – Civil Engineering

S. No	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			E .15		
				Theory			Practical			L	T	P			
				End Sem.	Mid Sem	Quiz/Assig- nment	End Sem.	Term work							
1.	BCET 401	ESC	Energy & Environmental Engineering	50	30	20	-	-	100	2	1	-	3		
2.	BCET 402	DC	Concrete Technology	100	30	20	30	20	200	3	1	2	5		
3.	BCET 403	DC	Structural Analysis-I	100	30	20	30	20	200	3	1	2	5		
4.	BCET 404	DC	Transportation Engineering-I	100	30	20	30	20	200	3	1	2	5		
5.	BCET 405	DC	Engineering Geology & Remote Sensing	100	30	20	30	20	200	3	0	2	4		
6.	BHUT401	BA	Universal Human Values	50	30	20	-	-	100	2	0	0	2		
7.	BCEP 407	DLC	90 hrs Internship based on using various software's – Internship -II	To be completed anytime during fourth semester. Its evaluation/credit to be added in fifth semester.									3		
			Total	500	150	100	150	100	1000	14	4	8	24		
8.	BCST 408	MC	Cyber Security	Non-credit course											
			NSS/NCC												

*A minimum of 2 hours per week should be allotted for the Virtual Lab along with the slot fixed for the conventional lab classes.

MST: Minimum of two mid semester tests to be conducted.

Director
Tula's Institute, Dehradun

1 Hr Lecture	1 Hr Tutorial	2 Hr Practical
1 Credit	1 Credit	1 Credit

Course Objectives:

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Course Outcomes

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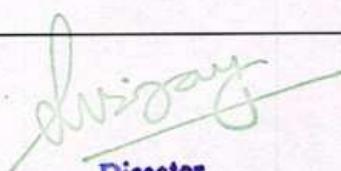


Dr. Divyanshu
Director
Tula's Institute, Dehradun

New Scheme of Examination as per AICTE Flexible Curricula
Bachelor of Technology (B.Tech.)II Year
[Mechanical Engineering]
W.E.F. Academic Session 2020-21

IV Semester

S. No.	Subject Code	Categ ory	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week		Tot al Cre dit	
				Theory			Practical						
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional		L	T	P	
1.	BMET 401 BMEP 401	DC	Applied Thermodynamics Engineering	100	30	20	30	20	200	3	1	2	5
2.	BECT 402	ESC	Energy & Environmental Engineering	100	30	20	-	-	150	3	1	-	4
3.	BMET 403 BMEP 403	DC	Theory Of Machine	100	30	20	30	20	200	3	1	2	5
4.	BMET 404 BMEP 404	DC	Fluid Mechanics	100	30	20	30	20	200	3	1	2	5
5.	BMET 405 BMEP 405	DC	Manufacturing Science & Technology-II	100	30	20			150	3	0	0	3
6.	BECT 406	HV	Universal Human Values-2	50	30	20	-	-	100	2	1	0	3
7.	BECP 407	DLC	90 hrs Internship based on using various software's – Internship -II	To be completed anytime during Third/fourth semester. Its evaluation/credit to be added in fifth semester.					*				
Total				550	180	120	90	60	1000	17	5	6	25
NSS/NCC													



Director
Tula's Institute, Dehradun

Course Objectives:

The objective of this course is to apply knowledge of mathematics, science, technology and engineering appropriate to energy science and engineering degree discipline and to enhance the understanding of conventional and non-conventional energy sources and its relationship with the ecology and environment. More precisely the objectives are:

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Dr. Jayant K. Srivastava
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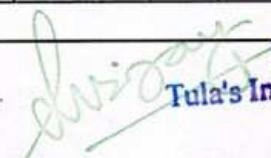
**[Computer Science and Engineering]
W.E.F. Academic Session 2020-21**

III Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BCET301	BSC-5	Energy & Environmental Engineering	100	30	20	--	--	150	3	1	0	4	
2.	BCST-302	DC-1	Discrete Structure	100	30	20	-	-	150	3	1	0	4	
3.	BCST-303 BCSP 303	DC-2	Data Structure	100	30	20	30	20	200	3	1	2	5	
4.	BECT 304 BECP 304	DC-3	Digital Electronics	100	30	20	30	20	200	3	1	2	5	
5.	BEET 305 BEEP 305	DC-4	Object Oriented Programming & Methodology	100	30	20	30	20	200	3	1	2	5	
6.	BCSP-306	DLC-3	Computer Workshop (Using Python)	-	-	-	30	20	50	-	-	2	1	
7.	BASP 107	DLC-1	Evaluation of Internship-I completed at I year level /Seminar for Lateral Entry students					-	50	50	0	0	2	
8.	BASP 307	DLC-4	90 hrs Internship based on using various software's –Internship -II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				500	150	100	120	130	1000	15	5	10	25	
NSS/NCC														

IV Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BAST 401	ESC	Mathematics- III	100	30	20	-	-	150	3	1	-	4	
2.	BECT 402 BECP 402	DC	Database Management Systems	100	30	20	30	20	200	3	1	2	5	
3.	BECT 403 BECP 403	DC	Software Engineering	100	30	20	30	20	200	3	-	2	4	
4.	BEET 404 BEEP 404	DC	Computer Org. & Architecture	100	30	20	30	20	200	3	1	2	5	
5.	BEET 404 BEEP 404	DC	Theory of Automata and Formal Languages	100	30	20	-	-	150	3	1	0	4	
6.	BHUT401	HV	Universal Human Values-2	50	30	20	-	-	100	2	1	0	3	
	BCST 408	MC	Cyber Security and software tools											
7.	BECP 407	DLC	90 hrs Internship based on using various software's –Internship -II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				550	180	120	90	60	1000	17	5	6	25	
NSS/NCC														


Director
Tula's Institute, Dehradun

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (BHUT-401)

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: "Understanding Harmony" is composed of practical work, which may include societal work or involvement of Faculty and Students

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)

Credits: L-T-P-C 2-1-0-3 (3 credits)

Semester: III/IV Compulsory Course for Engineering and Pharmacy elective for PG

Pre-requisites: None. Universal Human Values 1 (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

2. COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of 'I' and harmony in 'I'
5. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
3. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
4. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

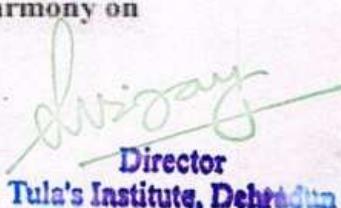
Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature
3. Understanding Existence as Co-existence of mutually interacting units in all pervasive space
4. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values



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Tula's Institute, Dehradoon

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

Self-assessment: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

6. OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Note: it may be followed by faculty-student or mentor-mentee programs throughout their time with the institution. The HV Workshop (5/8 days) is compulsory for faculty taking this course

2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. 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, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
5. Case studies of typical holistic technologies, management models and production systems
6. 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
7. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

3. READINGS

Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
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4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
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6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

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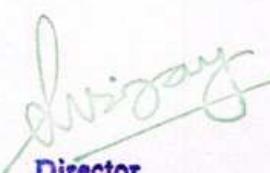
6. OUTCOME OF THE COURSE:

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Note: it may be followed by faculty-student or mentor-mentee programs throughout their time with the institution. The HV Workshop (5/8 days) is compulsory for faculty taking this course

EEE**Semester IV**

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Contact			
				Theory			Practical					
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Term work Lab Work & Sessional	L	T	P	
1.	BEET 402	DC	Signals and Systems	100	30	20	-	-	150	3	1	- 4
2.	BEET 402 BEEP 402	DC	Electrical Machine-I	100	30	20	30	20	200	3	1	2 5
3.	BECT 401 BECP 401	DC	Digital Electronics	50	30	20	30	20	200	3	0	2 4
4.	BEET 404 BEEP 404	DC	Power System-I	100	30	20	30	20	200	3	1	2 5
5.	BEET 405 BEEP 405	DC	Control System	100	30	20	-	-	150	3	1	0 4
6.	BHUT 401	DLC	Universal Human	50	30	20			100	2	0	0 2
7.	BENP 407	DLC	90 hrs Internship based on using various software's - Internship -II	To be completed anytime during fourth semester. Its evaluation/credit to be added in fifth semester.								
		Total		500	180	120	90	110	1000	17	4	6 24
8.	BCSP 408	MC	Cyber Security	Non-credit course								
		NSS/NCC										



Director
Tula's Institute, Dehradun

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (BHUT-401)

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: "Understanding Harmony" is composed of practical work, which may include societal work or involvement of Faculty and Students

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)

Credits: L-T-P-C 2-1-0-3 (3 credits)

Semester: III/IV Compulsory Course for Engineering and Pharmacy elective for PG

Pre-requisites: None. Universal Human Values I (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
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2. COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
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4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Director

Tulas Institute, Dehradun

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
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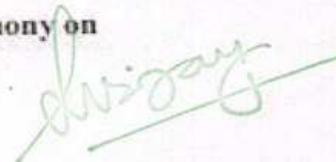
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Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values



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This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

Example:

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Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

6. OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

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11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

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Tula's Institute, Dehradun

New Scheme of Examination as per AICTE Flexible Curricula
Bachelor of Technology (B.Tech.) III Year
[Electronics and Communication Engineering]
W.E.F. Academic Session 2020-21

III Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BCET 301	BSC-5	Mathematics-III	100	30	20	--	--	150	3	1	0	4	
2.	BECT 302	DC-1	Electronic Measurement & Instrumentation	100	30	20	30	20	200	3	1	2	5	
3.	BECT 303	DC-2	Digital Electronics	100	30	20	30	20	200	3	1	2	5	
4.	BECT 304	DC-3	Electronic Devices	100	30	20	30	20	200	3	1	2	5	
5.	BEET 305	DC-4	Network Analysis & Synthesis	100	30	20	30	20	200	3	1	2	5	
6.	BASP 307	DLC-1	Evaluation of Internship-I completed at 1 year level /Seminar for Lateral Entry	-	-	-	-	50	50	-	-	4	2	
7		HV	90 hrs Internship based on using various software's -Internship-II	To be completed anytime during Third/ fourth semester. Its evaluation/credit to be added in fifth semester.										
Total				500	150	100	120	130	1000	15	5	12	26	
NSS/NCC														

IV Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional						
1.	BAST 401	ESC	Energy & Environmental Engineering	100	30	20	-	-	150	3	1	-	4	
2.	BECT 402	DC	Signal & Systems	100	30	20	-	-	150	3	1	-	4	
3.	BECT 403	DC	Analog Communication	100	30	20	30	20	200	3	1	2	5	
4.	BEET 404	DC	Control System	100	30	20	30	20	200	3	1	2	5	
5.	BECT 405	DC	Analog Circuits	100	30	20	30	20	200	3	1	2	5	
6.	BHUT-401	HV	Universal Human Value -2	50	30	20	-	-	100	2	1	0	3	
	BCST 408	MC	Cyber Security and PCB Design Software Simulation											
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Total				550	180	120	90	60	1000	17	6	6	26	
NSS/NCC														

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UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (BHUT-401)

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: "Understanding Harmony" is composed of practical work, which may include societal work or involvement of Faculty and Students

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)

Credits: L-T-P-C 2-1-0-3 (3 credits)

Semester: III/IV Compulsory Course for Engineering and Pharmacy elective for PG

Pre-requisites: None. Universal Human Values I (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

2. COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of 'I' and harmony in 'I'
5. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
3. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
4. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

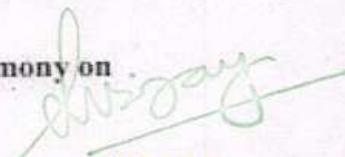
Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature
3. Understanding Existence as Co-existence of mutually interacting units in all pervasive space
4. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values


Director
Tula's Institute, Dehradun

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

Self-assessment: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

6. OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Note: it may be followed by faculty-student or mentor-mentee programs throughout their time with the institution. The HV Workshop (5/8 days) is compulsory for faculty taking this course

2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. 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, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
5. Case studies of typical holistic technologies, management models and production systems
6. 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
7. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

3. READINGS

Text Book

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12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

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This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

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Uttarakhand Technical University, Dehradun
Scheme of Examination as per AICTE Flexible Curricula
Evaluation Scheme & Syllabus for B. Tech Second Year
W.E.F. Academic Session 2019-20
II Year (III SEMESTER) – Civil Engineering

S. No	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			G rp	
				Theory			Practical			L	T	P		
				End Sem.	Mid Sem	Quiz/Assig nment	End Sem.	Term work		Lab Work & Sessional				
1.	BCET 401	ESC	Energy & Environmental Engineering	50	30	20	-	-	100	2	1	-	3	
2.	BCET 402 BCEP 402	DC	Concrete Technology	100	30	20	30	20	200	3	1	2	5	
3.	BCET 403 BCEP 403	DC	Structural Analysis-I	100	30	20	30	20	200	3	1	2	5	
4.	BCET 404 BCEP 404	DC	Transportation Engineering-I	100	30	20	30	20	200	3	1	2	5	
5.	BCET 405 BCEP 405	DC	Engineering Geology & Remote Sensing	100	30	20	30	20	200	3	0	2	4	
6.	BHUT401	BA	Universal Human Value	50	30	20	-	-	100	2	0	0	2	
7.	BCEP 407	DLC	90 hrs Internship based on using various software's – Internship -II	To be completed anytime during fourth semester. Its evaluation/credit to be added in fifth semester.									3	
			Total	500	150	100	150	100	1000	14	4	8	24	
8.	BCST 408	MC	Cyber Security	Non-credit course										
			NSS/NCC											

*A minimum of 2 hours per week should be allotted for the Virtual Lab along with the slot fixed for the conventional lab classes.

MST: Minimum of two mid semester tests to be conducted.

1 Hr Lecture	1 Hr Tutorial	2 Hr Practical
1 Credit	1 Credit	1 Credit

[Signature]
Director
Tula's Institute, Dehradun

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (BHUT-401)

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: "Understanding Harmony" is composed of practical work, which may include societal work or involvement of Faculty and Students

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)

Credits: L-T-P-C 2-1-0-3 (3 credits)

Semester: III/IV Compulsory Course for Engineering and Pharmacy elective for PG

Pre-requisites: None. Universal Human Values 1 (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

2. COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration—what is it? - Its content and process; 'Natural Acceptance' and experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) Director
rather than as arbitrariness in choice based on liking-disliking

Dhaval G
Tula's Institute, Dehradun

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
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6. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
2. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
3. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
4. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self regulation in nature
3. Understanding Existence as Co-existence of mutually interacting units in all pervasive space
4. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values

Swigyan
Director
Tula's Institute, Dehradun

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This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

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Niraj
Director
Tula's Institute, Dehradun

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4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

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Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

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Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

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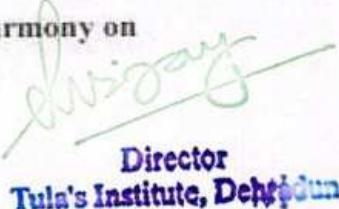
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Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

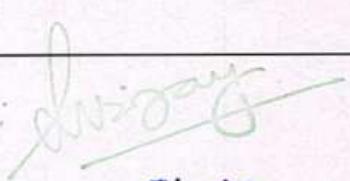
1. Natural acceptance of human values


Director
Tula's Institute, Dehradoon

New Scheme of Examination as per AICTE Flexible Curricula
Bachelor of Technology (B.Tech.) II Year
[Mechanical Engineering]
W.E.F. Academic Session 2020-21

IV Semester

S. No.	Subject Code	Categ ory	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per Week			Tot al Cre dit		
				Theory			Practical								
				End Sem	Mid Sem	Quiz / Assignment	End Sem	Term Work /Lab Work & Sessional		L	T	P			
1.	BMET 401 BMEP 401	DC	Applied Thermodynamics Engineering	100	30	20	30	20	200	3	1	2	5		
2.	BECT 402	ESC	Energy & Environmental Engineering	100	30	20	-	-	150	3	1	-	4		
3.	BMET 403 BMEP 403	DC	Theory Of Machine	100	30	20	30	20	200	3	1	2	5		
4.	BMET 404 BMEP 404	DC	Fluid Mechanics	100	30	20	30	20	200	3	1	2	5		
5.	BMET 405 BMEP 405	DC	Manufacturing Science & Technology-II	100	30	20			150	3	0	0	3		
6.	BECT 406	HV	Universal Human Values-2	50	30	20	-	-	100	2	1	0	3		
7.	BECP 407	DLC	90 hrs Internship based on using various software's – Internship -II	To be completed anytime during Third/fourth semester. Its evaluation/credit to be added in fifth semester.											
Total				550	180	120	90	60	1000	17	5	6	25		
NSS/NCC															


Director
Tula's Institute, Dehradun

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (BHUT-401)

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: "Understanding Harmony" is composed of practical work, which may include societal work or involvement of Faculty and Students

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)

Credits: L-T-P-C 2-1-0-3 (3 credits)

Semester: III/IV Compulsory Course for Engineering and Pharmacy elective for PG

Pre-requisites: None. Universal Human Values 1 (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
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The course has 28 lectures and 14 practice sessions in 5 modules:

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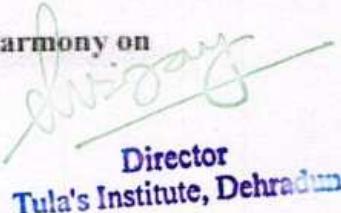
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Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

1. Natural acceptance of human values



Director
Tula's Institute, Dehradun

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1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own

self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, selfassessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

Self-assessment: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

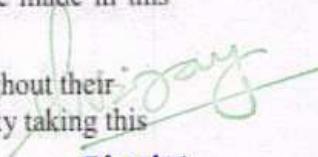
Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

6. OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Note: it may be followed by faculty-student or mentor-mentee programs throughout their time with the institution. The HV Workshop (5/8 days) is compulsory for faculty taking this course


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Scheme of Examination as per AICTE Flexible Curricula
W.E.F. Academic Session 2020-21
Bachelor of Technology (B.Tech.) [Civil Engineering]

V Semester

S. N. o.	Subject code	Category	Subject name	Maximum marks allotted					Total marks	Contact hours per week			Total credit		
				Theory			Practical			L	T	P			
				End sem	Mid sem	Quiz/ Assignm ent	End sem	Term work / lab work & sessional							
1.	BCET 501 BCEP 501	DC	Design of RC Elements	100	30	20	30	20	200	3	1	2	5		
2.	BCET 502 BCEP 502	DC	Geotechnical Engineering I	100	30	20	30	20	200	3	1	2	5		
3.	BCET 503 BCEP 503	DC	Fluid Mechanics	100	30	20	30	20	200	3	1	2	5		
4.	BCET 504 (A/B/C/D)	DE	Departmental Electives	100	30	20	-	-	150	3	1	0	4		
5.	BOEC 505 (A/B/C/D)	OE	Open Electives	100	30	20	-	-	150	3	1	0	4		
6.	BCEP 506	O/E Lab	Material Testing Lab	-	-	-	30	20	50	0	0	2	1		
7.	BCEP 507	DLC -I	Evaluation of Internship-II completed at II year level	-	-	-	-	50	50	-	-	2	1		
8.		IN	Internship -III	To be completed any time during Fifth/ Sixth semester. Its evaluation/credit to be added in Seventh semester.											
TOTAL				500	150	100	120	130	1000	15	5	10	25		

DEPARTMENTAL ELECTIVES		OPEN ELECTIVES	
BCET 504(A)	Structural Analysis II	BOEC 505 (A)	Renewable Energy Resources
BCET 504(B)	Quantity Surveying and Costing	BOEC 505 (B)	Transportation Engineering II
BCET 504(C)	Environmental Impact Assessment	BOEC 505 (C)	Operations Research
BCET 504(D)	Disaster Preparedness and Planning	BOET 504 (D)	Innovation and Entrepreneurship

Uttarakhand Technical University, Dehradun
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Civil Engineering, V-Semester

BCET 504 (C), Environmental Impact Assessment

3L, 1T, 0P

COURSE OBJECTIVES

- Appreciate the purpose and role of EIA in the decision-making process;
- Understand strengths & limitations of environmental management;
- Know procedures
- Understand screening & scoping processes Interpret options for evaluating environmental and social impacts;
- Know formats of EIA Report (Environmental Impact Statement, or Environmental Statement);
- Understand the purpose of developing follow-up procedures, and options for designing these procedures.

COURSE OUTCOMES

After studying this course, the students will be able to

- Understand the different steps within environmental impact assessment
- Discuss the implications of current jurisdictional and institutional arrangements in relation to environmental impact assessment
- Communicate both orally and in written form the key aspects of environmental impact assessment
- Understand how to liaise with and the importance of stakeholders in the EIA process
- Be able to access different case studies/examples of EIA in practice

SYLLABUS DETAILS:

UNIT-I

Concept of EIA : Introduction of EIA, Utility and scope of EIA, Significant Environmental Impacts, Stage of EIA, Environmental Inventory, Environmental Impact Statement (EIS)

UNIT-II

Methods of Impact Identification: Environmental Indices and indicators for describing the affected environment, matrix methodologies, network, checklist, and other method.

UNIT-III

Impact analysis: Framework, statement predication and assessment of impact of air, water, noise and socio-economic environment.

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UNIT-IV

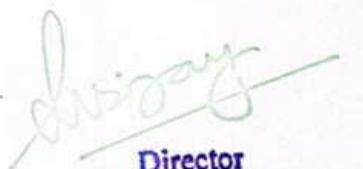
Preparation of written documentation: Initial planning phase, detailed planning phase, writing phase, organizing relevant information, co-ordination of team writing effort.

UNIT-V

Public Participation in Environmental Decision making: Basic definitions, Regulatory requirements, Advantages & disadvantages of Public Participation, Selection of Public participation techniques, Practical considerations for implementation.

Reference Books:-

1. A Handbook of Environment Impact Assessment by V. S. Kulkarni, Dr. S. N. Kaul, R. K. Trivedy
2. Introduction To Environmental Impact Assessment (Natural and Built Environment Series) 4th Edition by John Glasson & Riki Therivel
3. Environmental Impact Assessment by R.R. Barthwal
4. Environmental Impact Assessment: A Guide to Best Professional Practices by Charles H. Eccleston



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Civil Engineering, V-Semester

BOEC 505 (A), Renewable Energy Sources

3L, 1T, 0P

COURSE OBJECTIVES

1. Understanding basic characteristics of renewable sources of energy and technologies for their utilization.
2. To give review on utilization trends of renewable sources of energy.
3. To give review on legislative and regulatory rules related to utilization of renewable sources of energy.
4. Make interpretation about the energy sources.
5. To comprehend the energy & its resources.

COURSE OUTCOMES

1. Understand the need of energy conversion and the various methods of energy storage.
2. Explain the field applications of solar energy.
3. Identify Winds energy as alternate form of energy and to know how it can be tapped.
4. Explain biomass generation and its impact on environment.
5. Understand the Geothermal & Tidal energy, its mechanism of production and its applications.
6. Illustrate the energy efficient motors & equipments for better applications.

SYLLABUS DETAILS:

Unit - I

Renewable Energy Systems Energy Sources, Comparison of Conventional and nonconventional, renewable and non-renewable sources. Statistics of world resources and data on different sources globally and in Indian context. Significance of renewable sources and their exploitation. Energy planning. Energy efficiency and management.

Unit - II

Wind Energy System Wind Energy, Wind Mills, Grid connected systems. System configuration, working principles, limitations. Effects of wind speed and grid conditions. Grid independent systems - wind-battery, wind- diesel, and wind-hydro biomass etc. wind operated pumps, controller for energy balance. Small Hydro System Grid connected system, system configuration, working principles, limitations. Effect of hydro potential and grid condition. Synchronous versus Induction Generator for standalone systems. Use of electronic load controllers and self excited induction generators. Wave Energy System: System configuration: grid connected and hybrid Systems.

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Unit - III

Solar Radiation Extraterrestrial solar radiation, terrestrial solar radiation, Solar thermal conversion, Solar Photonic System Solar cell, Solar cell materials, efficiency, Characteristics of PV panels under varying insulation. PV operated lighting and water pumps, characteristics of motors and pumps connected to PV panels. Biomass Energy System: System configuration, Biomass engine driven generators, feeding loads in stand-alone or hybrid modes, Biomass energy and their characteristics.

Unit - IV

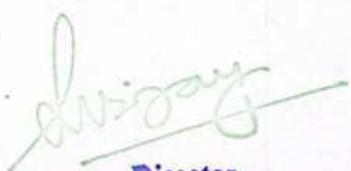
Energy from oceans Ocean temperature difference, Principles of OTEC, plant operations, Geothermal Energy Electric Energy from gaseous cells, Magneto-hydro generated energy, Non hazardous energy from nuclear wastes, Possibilities of other modern nonconventional energy sources.

Unit - V

Electric Energy Conservation Energy efficient motors and other equipment. Energy saving in Power Electronic controlled drives. Electricity saving in pumps, airconditioning, power plants, process industries, illumination etc. Methods of Energy Audit. Measurements systems; efficiency measurements. Energy regulation, typical case studies, various measuring devices analog and digital, use of thyristers.

Reference Books:-

1. John Twidell & Toney Weir, Renewable Energy Resources, E & F N Spon.
2. El-Wakil, Power Plant Technology, McGraw Hill.
3. Rai G D, Non-conventional Energy Resources, Khanna.
4. F Howard E. Jordan, "Energy-Efficient Electric Motor & their Application-II", Plenum Press, New York USA
5. Anna Mani, "Wind Energy Resource Survey in India-III", Allied Publishers Ltd., New Delhi,
6. S.P. Sukhatme: Solar Energy, TMH- 4e,
8. Solanki -Renewable Energy Technologies - PHI Learning
9. Sawhney -Non Conventional Energy Resources - PHI Learning



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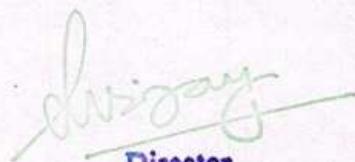
VI Semester

S. N o.	Subject code	Category	Subject name	Maximum marks allotted					Total marks	Contact hours per week			Total credit	
				Theory			Practical			L	T	P		
				End sem	Mid sem	Quiz/ Assignment	End sem	Term work / lab work & sessional						
1.	BCET 601 BCEP 601	DC	Design of RC Structures	100	30	20	30	20	200	3	1	2	5	
2.	BCET 602 BCEP 602	DC	Environmental Engineering I	100	30	20	30	20	200	3	1	2	5	
3.	BCET 603 BCEP 603	DC	Open Channel Flow	100	30	20	30	20	200	3	1	2	5	
4.	BCET 604 (A/B/C/D)	DE	Departmental Electives	100	30	20	-	-	150	3	1	0	4	
5.	BOEC 605 (A/B/C/D)	OE	Open Electives	100	30	20	-	-	150	3	1	0	4	
6.	BCEP 606	O/E Lab	OE Lab/ Advance Surveying Lab	-	-	-	30	20	50	0	0	2	1	
7.	BCEP 507	P	Minor Project I	-	-	-	-	50	50	-	-	2	1	
8.		IN	Internship -III	During semester 5/6										
TOTAL				500	150	100	60	90	1000	15	5	10	25	

Uttarakhand Technical University, Dehradun
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DEPARTMENTAL ELECTIVES		OPEN ELECTIVES	
BCET 604(A)	Geotechnical Engineering II	BOEC 605 (A)	Principles of Management
BCET 604(B)	Precast and Modular Construction	BOEC 605 (B)	Environmental Management & Sustainable Development
BCET 604(C)	Cost Effective and Eco Friendly Structures	BOEC 605 (C)	Advance Pavement Design
BCET 604(D)	Urban and Town Planning	BOEC 605 (D)	Subject from SWAYAM

Civil Engineering, V-Semester



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New Scheme of Examination as per AICTE Flexible Curricula
Civil Engineering, VI-Semester

BCET 602, Environmental Engineering I

3L, 1T, 2P

COURSE OBJECTIVES

1. To provide a sound understanding of different sources of water.
2. To understand the different methods used to calculate water demands.
3. To learn different plumbing methods to transport water to different sources.
4. To study about wastewater and its physical, chemical & biological aspects.
5. To study different types of sewers and its layout.

COURSE OUTCOMES

1. Identify the source of water and water demand apply the water treatment concept.
2. Select the treatment to raw water with suitable intake with usefulness for domestic and construction purpose.
3. Laying the pipe-network for water supply and Sewage disposal effectively.
4. Check physicochemical parameters of raw water as per the standards.
5. Plan and implement plumbing work effectively by choosing suitable materials.
6. Calculate waste water generation with suitable water carriage system.

DETAILED SYLLABUS

UNIT-1

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.

Sources of water: Kinds of water sources and their characteristics, collection of surface and groundwater; quality of surface and ground waters; factors governing the selection of a source of water supply; intakes and their design for lakes, streams and rivers, impounding reservoir and canal; determination of the capacity of impounding reservoir.

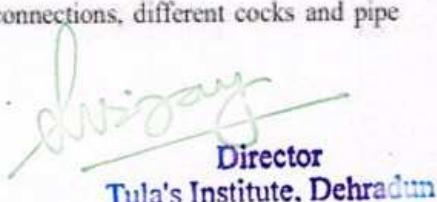
UNIT-2

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; water hammer and its control measures.

UNIT-3

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, Hardy - Cross method, Newton - Raphson's method and equivalent pipe method of pipe network analysis; rural water supply distribution system.

Water supply, plumbing systems in buildings and houses: water connections, different cocks and pipe fittings, hot water installation.



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UNIT-4

Wastewater & its Characteristics: Quality and Quantity Perspectives of Sewage: Physical, chemical and biological characteristics of sewage, analysis of sewage. Systems of sanitation and wastewater collection, estimation of dry weather flow, estimation of storm water flow and variations in wastewater flows. Storm water: Collection and estimation of storm water by different formulae.

UNIT -5

Flow in sewers: Flow in full and partially full sewers and design of sewers; types of sewers, materials and construction of sewers, joints and sewer appurtenances, layout and construction of sewer lines. Plumbing systems for waste water disposal, types of sewers, design considerations, construction & maintenance, storm water sewers.

TEXT/ REFERENCE BOOKS

1. Nazaroff: Environmental Engineering Science, Wiley India
2. Hammer and Hammer Jr.: Water and Wastewater Technology
3. Steel & McGhee: Water Supply & Wastewater Disposal
4. S.K. Garg: Water supply Engineering – Environmental Engineering (Vol I)- Khanna Publishers
5. P.N. Modi: Water supply Engineering–Environmental Engineering (Vol.I)-Standard Book

BCEP 602 LIST OF EXPERIMENTS:

1. Determination of pH in water
2. Determination of Color in water
3. Determination of Turbidity in water
4. Determination of TS, TDS and TSS in water
5. Determination of CO₂ in water
6. Determination of Alkalinity in water
7. Determination of Hardness in water
8. Determination of Chloride in water
9. Determination of Total Iron in Water
10. Determination of Arsenic in water
11. Determination of percentage of available chlorine in bleaching powder, Determination of Residual Chlorine



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Uttarakhand Technical University, Dehradun
New Scheme of Examination as per AICTE Flexible Curricula
Civil Engineering, VI-Semester

BCET 604 (C), Cost Effective and Eco Friendly Structures

3L, 1T, 0P

COURSE OBJECTIVES

1. To understand the environmental issues due to building materials and the energy consumption in manufacturing building materials
2. To study the cost effective construction techniques and equipment's
3. To study how to make sanitation cost effective
4. To study how to make road construction eco-friendly
5. To understand the Green building rating system

COURSE OUTCOMES

Upon completion of the course the student should be able to:

1. Understand the Definition, Concept & Objectives of the terms cost effective construction
2. Apply cost effective techniques in construction
3. Apply cost effective Technologies and Methods in Construction
4. State the Concept of Green Building
5. Apply low cost and eco-friendly road construction techniques

SYLLABUS DETAILS:

Unit -I

Concepts of energy efficient & environment friendly materials and techniques. Cost effective materials: - Soil, Fly ash, Ferrocement, Lime, Fibres, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer. Energy Efficient & Environment friendly building material products: - Walls - Stabilised and sun dried, soil blocks & bricks, Solid & Hollow concrete blocks, stone masonry blocks, Ferrocement partitions. Roofs - Precast R.C. Plank & Joists roof, precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler Slab, SeasalFibre roof, Improved country tiles, Thatch roof, M.C.R. tile.

Unit -II

Cost effective construction techniques and equipments :- (a) Techniques: - Rat trap bond construction, Energy Efficient roofings, Ferrocement technique, Mud Technology. (b) Equipment's:- Brick moulding machine, Stabilised soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile making machine, Ferrocement wall panel & Roofing channel making machine, R.C.C. Chaukhat making m/c.

Unit -III

Cost effective sanitation: - (a) Waste water disposal system (b) Cost effective sanitation for rural and urban areas (c) Ferrocement Drains

Unit -IV

Low Cost Road Construction: - Cost effective road materials, stabilization, construction techniques tests, equipment used for construction, drainage, maintenance.

UNIT-V

Cost analysis and comparison: - (a) All experimental materials (b) All experimental techniques Green Building rating systems

Reference books:-

1. Alternative Building Materials and Technologies – K S Jagadeesh, B V Venkatta Rama Reddy & K S NanjundaRao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – AskoSarja - CRC Press
3. Non-conventional Energy Resources –D S Chauhan and S K Sreevastava – New Age International Publishers
4. Buildings How to Reduce Cost – Laurie Backer - Cost Ford
5. Lynne Elizabeth, Cassandra Adams Alternative Construction: Contemporary Natural BuildingMethods ", Softcover, Wiley & Sons Australia, Limited, John,2005
6. Givoni, "Man, Climate, Architecture, Van Nostrand, New York, 1976.
7. Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery,John Wiley & Sons,2005.
8. Eugene Eccli- Low Cost, Energy efficient shelter for owner & builder, Rodale Press, 1976



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New Scheme of Examination as per AICTE Flexible Curricula
Civil Engineering, VI-Semester

BOEC 605 (B), Environmental Management & Sustainable Development

3L, 1T, 0P

COURSE OBJECTIVES:

1. A deep understanding of the current status and future trends in sustainable development and social corporate responsibility.
2. Application of environmental tools and techniques to integrate sustainable practices (economical, environmental and social concerns).
3. Adaptation to continuously increasing strictness of environmental legislation.
4. Understand the economic and social justifications for various environmental policy approaches made at different levels.

COURSE OUTCOME:

1. Innovative pollution control practices
2. Adaptation of strategic environmental assessment approaches in different contexts and different levels of decision making.
3. Evaluation of environmental policies in a cost benefit analysis concept

DETAILED SYLLABUS

UNIT I. Introduction and scope: inter-linkages of energy-environment and economy from engineering infrastructure perspective. Concepts of ecology, Systems approach and sustainability engineering.

UNIT II. Environment and Energy: Interaction between energy and environmental resources, Environmental quality Standards and Indices (Indian and International).Environmental monitoring, Analysis, statistics and Data interpretation.

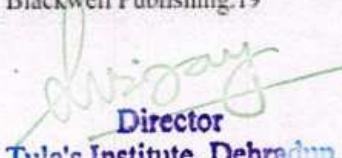
UNIT III: Environmental Guidelines: Environmental management system, Guidelines for Environmental Management & Sustainable Development (ISO 14000 Series).

UNIT IV: Environmental Impact:Impact assessment, life cycle assessment and risk analysis of scientific and technological developments.

UNIT V: Environmental Laws and Regulations: Environmental legislations, ethics and social responsibility. Sustainable development within the context of global economy, Technology and climate change.

References:

1. Baker, S., "Sustainable Development", Taylor & Francis's. 2006
2. Krishnamurthy, B., "Environmental Management", Prentice Hall of India. 2005
3. Friedman, F.B., "Practical Guide to Environmental Management", Environmental Law Institute. 2003
4. Environmental Management Plans Demystified: A Guide to ISO 14001-Samp Press. 2001.
5. Calow, P., "Handbook of Environmental Risk Assessment and Management", Blackwell Publishing. 19

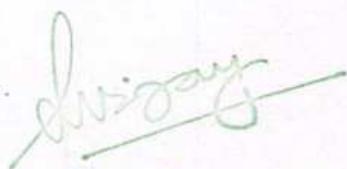

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VII Semester

S. N o.	Subject code	Category	Subject name	Maximum marks allotted					Total marks	Contact hours per week			Total credit	
				Theory			Practical			L	T	P		
				End sem	Mid sem	Quiz/ Assignm ent	End sem	Term work / lab work & sessional						
1.	BCET 701 BCEP70 1	DC	Environmental Engineering II	100	30	20	30	20	200	3	1	2	5	
2.	BCET 702 BCEP70 2	DC	Design of Steel Structures	100	30	20	30	20	200	3	1	2	5	
3.	BCET 703 (A/B/C)	DE	Departmental Elective	100	30	20	-	-	150	3	1	0	4	
4.	BOEC 704 (A/B/C)	OE	Open Elective	100	30	20	-	-	150	3	1	0	4	
5.	BCEP 705	D Lab	Open Source S/w Lab	-	-	-	30	20	50	0	0	2	1	
6.	BCEP 706	DL C-1	Evaluation of Internship-III completed at III year level	-	-	-	-	50	50			2	1	
7.	BCEP 707	P	Minor Project II	-	-	-	50	50	100	0	0	4	2	
TOTAL				400	120	80	140	160	900	12	4	12	22	

DEPARTMENTAL ELECTIVES		OPEN ELECTIVES	
BCET 703(A)	Railway & Airport Engineering	BOEC 704 (A)	Hydrology
BCET 703(B)	Bridge Engineering	BOEC 704 (B)	Infrastructure Planning and Management
BCET 703(C)	Ground Water Engineering	BOEC 704 (C)	Subject from SWAYAM



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Civil Engineering, VII-Semester

BCET 701, Environmental Engineering II

3L: 1T:2P

COURSE OBJECTIVES

1. To introduce the students to the area of water and wastewater treatment.
2. The course will cover water chemistry; characteristics of water & wastewater; primary, secondary & tertiary treatment processes.
3. To learn about solid waste management and its disposal.
4. To have insight knowledge of Industrial waste that causes pollution on large basis.
5. To learn about purification of wastewater and its usage for various irrigation purposes.

COURSE OUTCOMES

1. Appreciate the importance and methods of operation and maintenance of wastewater supply systems.
2. Communicate effectively in oral and written presentations to technical and non-technical audiences the applications of waste water treatment and its significance in society.
3. Be able to understand the concept of sewerage system and its network layout.
4. Appreciate the understanding of different processes involved in the treatment of sewage.
5. Be able to apply the basis of an Environmental Management System (EMS) to an industrial activity.

DETAILED SYLLABUS:

UNIT-1

Wastewater Treatment: On site and centralized treatment systems. Various treatment systems involved to clean waste water

UNIT-2

Pre-and Primary Treatment: Screen, grit removal, oil and grease removal, sedimentation and flocculation tank, settling velocity and surface overflow rate.

UNIT-3

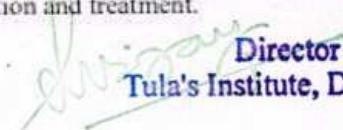
Secondary Treatment: Activated sludge process, conventional and extended aeration, waste stabilization ponds, UASB process, UASB post treatment.

UNIT-4

Tertiary Treatment: Advanced Wastewater Treatment. Reuse systems, wastewater disposal on and water bodies, disposal of sludge.

UNIT-5

Municipal Solid Waste& Industrial Waste: Collection, characterization, transport, treatment & Disposal. Liquid, solid, atmospheric and hazardous wastes: Characterization and treatment.


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TEXT/ REFERENCE BOOKS

1. Davis, M.L. and Cornwell, D.A., "Introduction to Environmental Engineering", McGraw Hill.
2. Master, G.M., "Introduction to Environmental Engineering and Science", Prentice Hall of India.
3. P.N. Modi: Sewage treatment & Disposal and waste water Engineering – Environmental Engineering (Vol.II), Standard Book House.
4. S.K. Garg, Sewage Disposal and Air Pollution Engineering – Environmental Engineering (Vol.II), Khanna Publishers.
5. Metcalf & Eddy, Inc., Waste water Engineering Treatment and Reuse, McGraw Hill

BCEP 701 LIST OF EXPERIMENTS:

1. Determination of pH in waste water.
2. Determination of Color in water
3. Determination of Turbidity in water
4. Determination of Solids in Sewage
 - a. Total Solids,
 - b. Suspended Solids,
 - c. Dissolved Solids,
 - d. Volatile solids,
 - e. fixed solids ,
 - f. Settleable solids
5. Determination of Dissolved Oxygen
6. Determination of BOD
7. Determination of COD



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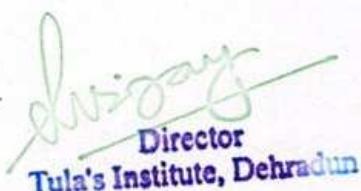
New Scheme of Examination as per AICTE Flexible Curricula
Bachelor of Technology (B.Tech.) III Year
[Mechanical Engineering]
W.E.F. Academic Session 2020-21

VI Semester

S. No	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assign ment	End Sem	Term Work /Lab Work & Sessional						
1.	BMET 601 BMEP 601	DC	Turbo machinery	100	30	20	30	20	200	3	1	2	5	
2.	BMET 602 BMEP 602	DC	Machine Component Design -II	100	30	20	30	20	200	3	0	4	5	
3.	BMET -603 BMEP 603	DC	Refrigeration and Air-condition	100	30	20	30	20	200	3	1	2	5	
4.	BMET - 604(A/B/C)	DE	Departmental Elective	100	30	20			150	3	0	0	3	
5.	BOME -605	OE	Open Elective	100	30	20			150	3	0	0	3	
6.	BMEP -607	P	Minor Project -I					50	50	0	0	4	2	
7.	BMEP -608	P	Open Source Lab	-	-	-	30	20	50	0	0	2	1	
		IN	Internship -III	To be completed any time during Fifth/ Sixth semester. Its evaluation/credit to be added in Seventh semester										
Total				500	150	100	120	130	1000	15	2	12	24	

Departmental Electives			Open Electives			
BMET 604(A)	Mechatronics		BOME 605(A)		Robotics	
BMET 604 (B)	Finite Element Method		BOME 605 (B)		Optimization Techniques	
BMET 604 (C)	Product Design		BOME 605 (C)		Renewable Energy Technology	

***Students may also earn credits of open elective through NPTEL/Swayam.**



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Mechanical Engineering, VI-Semester

BMET- 605 (C) Renewable Energy Technology	L	T	P
	3	0	0

Objectives:

1. Understand the various forms of conventional energy resources.
2. Learn the present energy scenario and the need for energy conservation
3. Explain the concept of various forms of renewable energy
4. Outline division aspects and utilization of renewable energy sources for both domestic and industrial application
5. Analyse the environmental aspects of renewable energy resources.

Course Outcome:

1. Describe the environmental aspects of non-conventional energy resources.
2. Know the need of renewable energy resources, historical and latest developments.
3. Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
4. Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
5. Understand the concept of Biomass energy resources and their classification, types of biogas Plants-applications

Detailed Content:

UNIT-I Solar Radiation:

Extra-terrestrial and terrestrial, radiation measuring instrument, radiation measurement and predictions. Solar thermal conversion: Basics, Flat plate collectors-liquid and air type. Theory of flat plate collectors, selective coating, advanced collectors, Concentrators: optical design of concentrators, solar water heater, solar dryers, solar stills, solar cooling and refrigeration. Solar photovoltaic: Principle of photovoltaic conversion of solar energy; Technology for fabrication of photovoltaic devices; Applications of solar cells in PV generation systems; Organic PV cells.

UNIT-II Wind Energy:

Characteristics and measurement: Metrology of wind speed distribution, wind speed statistics, Weibull, Rayleigh and Normal distribution. Measurement of wind data, Energy estimation of wind regimes;

Wind Energy Conversion: Wind energy conversion principles; General introduction; Types and classification of WECS; Power, torque and speed characteristics; power curve of wind turbine, capacity factor, matching wind turbine with wind regimes; Application of wind energy.

UNIT-III Production of biomass:

Photosynthesis-C3 & C4 plants on biomass production; Biomass resources assessment; Co2 fixation potential of biomass; Classification of biomass; Physicochemical characteristics of biomass as fuel Biomass conversion routes: biochemical, chemical and thermo chemical Biochemical conversion of biomass to energy: anaerobic digestion, biogas production mechanism, technology, types of digesters, design of biogas plants, installation, operation and maintenance of biogas plants, biogas plant manure-utilization and manure values. Biomass Gasification: Different types, power generation from gasification, cost benefit analysis of power generation by gasification.

UNIT-IV Small Hydropower Systems:

Overview of micro, mini and small hydro system; hydrology: Elements of turbine; Assessment of hydro power; selection and design criteria of turbines; site selection and civil works; speed and voltage regulation; Investment issue load management and tariff collection; Distribution and marketing issues. Ocean Energy: Ocean energy resources, ocean

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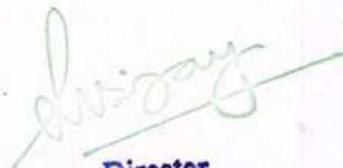
energy routes; Principle of ocean thermal energy conversion system, ocean thermal power plants. Principles of ocean wave energy and Tidal energy conversion.

UNIT-V Geothermal Energy:

Origin of geothermal resources, type of geothermal energy deposits, site selection geothermal power plants; Hydrogen Energy: Hydrogen as a source of energy, Hydrogen production and storage. Fuel Cells: Types of fuel cell, fuel cell system and sub-system, Principle of working, basic thermodynamics

Suggested Bookss:

1. Kothari, Singal&Rajan; Renewable Energy Sources and Emerging Technologies, PHI Learn
2. Khan, B H, Non Conventional Energy, TMH.
3. Sukhatme and Nayak, Solar Energy, Principles of Thermal Collection and Storage, TMH.
4. Tiwari and Ghosal, Renewable Energy Resources: basic principle & application, NarosaPubl
5. KoteswaraRao, Energy Resources, Conventional & Non-Conventional, BSP Publication.
6. Chetan Singh Solanki, Solar Photovoltaics: Fundamental, technologies and Application, PHI L
7. AbbasiTanseem and Abbasi SA; Renewable Energy Sources; PHI Learning
8. Ravindranath NH and Hall DO, Biomass, Energy and Environment, Oxford University Press.
9. Duffie and Beckman, Solar Engineering of Thermal Process, Wiley
10. Nikolai, Khartchenko; Green Power; Tech Book International
11. Tester, Sustainable Energy-Choosing Among Options, PHI Learning.
12. Godfrey Boyle, Renewable Energy: Power for a sustainable future, Oxford OUP. 24



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Bachelor of Technology (B.Tech.)IV Year
[Mechanical Engineering]
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VII Semester

S. No	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total marks	Contact Hours per Week			Total Credit	
				Theory			Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assig nmen t	End Sem	Term Work /Lab Work & Session al						
1.	BMET 701	DC	Maintenance and Safety	100	30	20			150	3	0	0	3	
2.	BMET-702 BMEP-702	DC	Computer Integrated Manufacturing	100	30	20	30	20	200	3	0	2	4	
3.	BMET-703	DE	Departmental Elective	100	30	20	-	-	150	3	0	0	3	
4.	BMET-704	OE	Open Elective	100	30	20	-	-	150	3	0	0	3	
5.	BMEP-705	D Lab	Simulation lab/Virtual Lab (Ansys/MATLAB)	-	-	-	30	20	50	0	1	2	2	
6.	BMEP-507	IN	Internship III	-	-	-	-	50	50	-	-	2	1	
7.	BMEP-706	P	Minor Project-2	-	-	-	50	50	100	0	0	4	2	
Total				400	120	80	110	190	900	12	1	10	18	
NSS/NCC														

Departmental Electives		Open Electives		
BMET 703(A)	Nano Materials	BMET 704(A)	Energy Conservation	
BMET 703(B)	Computational Fluid Dynamics	BMET 704(B)	Introduction to AI	
BMET 703(C)	Mechanical Vibration	BMET 704(C)	MEMS & Microsystems Technology	

***Students may also earn credits of open elective through NPTEL/Swayam.**



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Mechanical Engineering, VII-Semester

BMET-704 (A)	Energy Conservation	L	T	P
		3	0	0

Objectives:

1. To present a problem oriented in depth knowledge of Alternate fuel and energy system.
2. To address the underlying concepts and methods behind alternate fuel and energy system.

Course Outcome:

1. Categorize, interpret and understand the essential properties of fuels for IC engines
2. Identify the need for alternate fuels and characterize prospective alternate fuels
3. Evaluate the vehicle fuel storage and dispensing facility requirements.
4. Analyze the implement limitations with regard to performance, emission and materials compatibility.
5. Develop strategies for control of emissions as per the legislation standards.

Detailed Content:

Unit -I

Energy Audit: Definition, Need and Objectives.

Types of Energy Audit: Internal Audit, External Audit, Walk through Energy Audit, Preliminary Energy Audit, Detailed Energy Audit, Industrial Energy Audit, Utility (Services) Energy Audit, Commercial Energy Audit, Residential Energy Audit.

Basic Components of Energy Audit: Preparing for Audit Visit, Instrumentation, Data Collection, Technoeconomic Analysis, Safety Considerations

Unit -II

Fuel Analysis

Proximate Analysis, Ultimate Analysis, Calorific Value, Combustion: Theoretical Air Requirement.

Insulation and Refractories

Insulation Type and Application, Economic Thickness of Insulation, Heat Savings and Application Criteria, Refractory-Types, Selection and Application of Refractories.

Boilers:

Types, FBC Boilers, Mechanism of Fluidized Bed Combustion, Saving Potential, Analysis of Losses, Performance Evaluation, Blow Down, Energy Conservation Opportunities.

Unit -III

Steam System:

Properties of Steam, Assessment of Steam Distribution Losses, Steam Leaks, Steam Trapping, Condensate and Flash Steam Recovery System, Identifying Opportunities for Energy Saving.

Cogeneration and Trigeneration

Need, Applications, Advantages, Combined Cycles, Saving Potential

Unit -IV

Waste Heat Recovery:

Availability and Reversibility, First and Second Law Efficiencies, Classification, Advantages and Applications, Commercially Viable Heat Recovery Devices, HVAC and Refrigeration



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System.FactorsAffecting Refrigeration and Air Conditioning System Performance and Savings Opportunities..Distribution systems for conditioned air.

Compressed Air Systems

Types of air compressors, compressor efficiency, efficient compressor operation, compressed airsystems components, capacity assessment, leakage test, factors affecting the performance andenergy savings opportunities.

Unit IV

Pumps and Pumping System

Performance evaluation, efficient system operation, flow control strategies and energyconservation opportunities.

Unit V

Electrical Systems: Active power, reactive power and apparent power, star, delta connection,electrical load management and electrical billing.

Power Factor: Power factor, Power factor improvement and its benefit, selection and location ofcapacitors, and energy conservation opportunities.

Electric Motors: Types, losses in induction motors, motor efficiency, factor affecting motorperformance, rewinding and motor replacement issues, energy saving opportunities in motors, energyefficient motors, soft starter with energy savers.

Suggested Books:

1. G. L. Witte, Phillips S.Scbmidt and Daid R. Brown, Industrial Energy Management andUtilization, Hemisphere Publishing Corporation, Washington
2. Carig.B. Saith, Energy Management Principles, Applications, Bnefit and Saving, Per nPress, New York.
3. F. W. Pyne, PgEnergy Conservation Manual, Fairmont Poem, INC.P.O. Box 14227Atlanta,GA 30224
4. D. Patrick and S.W. Fardo, Energy U-sent and Conservation, Prentice Hall, INC EngleweekCliffs (NJ) 7632.
5. W R Murphy & G McKay, Energy Management, Elsiver/BSP hyderabad

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VIII Semester

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted				Total marks	Contact Hours per Week			Total Credit	
				Theory		Practical			L	T	P		
				End Sem	Mid Sem	Quiz / Assi gnm ent	End Sem		Term Work / Lab Work & Sessional				
1.	BMET 801	DC	Operation research	100	30	20		150	3	1	0	4	
2	BMET 802 BMEP-802	DC	Automobile	100	30	20	30	20	200	3	1	2	5
3	BMET-803	DE	Departmental Elective	100	30	20			150	3	0	0	3
4.	BMET-804	OE	Open Elective	100	30	20			150	3	0	0	3
5	BMEP-805	S	Open source Lab					50	50	0	0	2	1
6	BMEP-806	P	Major Project				100	100	200	0	0	8	4
Total				400	120	80	50	200	900	12	2	12	20

Departmental Electives			Open Electives		
BMET-802 (A)	Power Plant Engineering		BMET-803 (A)	Concepts of programming and OOPS	
BMET-802 (B)	Solar Energy		BMET-803 (B)	Environment and Ecology	
BMET-802 (C)	Experimental Stress Analysis		BMET-803 (C)	Programming in python	



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Mechanical Engineering, VII-Semester

BMET-803 (B) Solar Energy	L	T	P
	3	0	0

Objectives:

On completion of the course, learner will be able to-

- Understand the concept of solar radiation & sun-Earth geometry.
- Explain different types of solar collectors.
- Explain different types of solar water & air heating systems.
- Recognize and understand the different applications of solar distillation systems.
- Understand the concept of solar Photovoltaic systems.

Course Outcome:

After learning the course, the students should be able to

- Understand basics of solar radiation.
- Understand the concept of flat plate and evacuated solar collector
- Comprehend the concept of solar water heating, solar air heating.
- Understand the principles of solar concentrator and solar distillation.
- Understand the types and features of solar photovoltaic systems.

Detailed Content:

Unit-I Overview & Introduction :

Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Sun-Earth geometry, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Importance of Solar energy.

UNIT-II Solar Thermal Systems:

Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion, Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar greenhouses.

UNIT-III Solar water & air heating Systems:

Introduction to Solar water & solar air heating systems, Classification of Solar water & air heating system, choice of fluid, conventional heater, double exposure heaters, air heater with flow above and both sides of the absorber, heater with finned absorber.

UNIT-IV Solar distillation Systems & Energy storage

Solar distillation:

Introduction, working principle, thermal efficiency, heat transfer, passive solar still, designs of solar still, modified internal heat transfer.

Energy Storage: sensible heat storage, liquid media storage, solid media storage, dual media storage, basics of latent heat storage, chemical storage.

UNIT-V Solar Photovoltaic Systems:

Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping

Texts/References Books:

1. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
2. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc Graw Hill Publishers, 1999.
3. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd
4. Solar Energy Utilization, G. D. Rai, Khanna Publishers



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New Scheme of Examination as per AICTE Flexible Curricula
Mechanical Engineering, VIII-Semester

BMET- 804(B) Environment and Ecology	L	T	P
	3	0	0

Objectives:

1. .

Course Outcome:

1. .

Detailed Content:

UNIT-1 NATURAL RESOURCES :

Renewable and Non-renewable Resources :

Natural resources and associated problems.

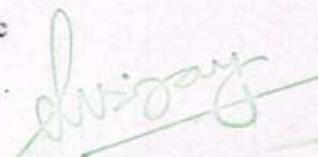
- a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources : World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

UNIT- 2 ECOSYSTEMS

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystems :-
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT- 3 BIODIVERSITY AND ITS CONSERVATION

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic



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and option values

- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

UNIT- 4 ENVIRONMENTAL POLLUTION & SOCIAL ISSUES

- Definition
- Cause, effects and control measures :-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Disaster management : floods, earthquake, cyclone and landslides.
- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.

REFERENCE BOOK

- Environmental Studies by Erach Bharucha, University Press.
- Environmental studies by R. Rajagopalan, Oxford University Press.
- Environment Science & Ethics Singhal, Singhal & Aggarwal, Pragati Prakashan, Meerut.
- Environmental Studies by Anubha Kaushik & C.P. Kaushik, New age International Publisher.
- Environmental Science by Santra, N.C.B.A, Calcutta.
- Environment and Ecology by Deeksha Dave and S.S. Katewa, Cengage Learning, New Delhi.
- Environmental Studies by Daniel's, Wiley India.
- Fundamental of Ecology, E.P.Odum, Cengage Learning.
- Environmental Science and Engineering by Wright, Pearson Publication.
- Environmental Engineering by Vasilind, Cengage Learning, New Delhi.
- First Ecology by Beeby and Brennan, Oxford University Press.
- Environment Science by Miller, Cengage Learning, New Delhi.
- Introduction to Environmental Engineering and Science by G.M. Masters, Prentice Hall India Pvt. Ltd.
- o Hand book of Environmental laws, Rules, Guidelines, Compliances and Standards Vol. 1 & Vol. 2, Bharat Publication, New Delhi.



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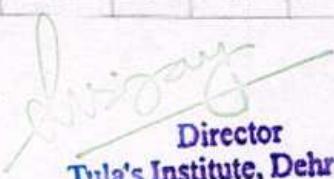
Semester wise Courses in B.Sc.(Hons.) Agriculture

Semester I

S.No	Course Code	Course Title	Credit Distribution			MM
			T	P	Total	
1.	BSAC-101	Fundamentals of Horticulture	1	1	2	100
1.	BSAC-102	Fundamentals of Plant Biochemistry and Biotechnology	2	1	3	100
2.	BSAC-103	Fundamentals of Soil Science	2	1	3	100
3.	BSAC-104	Introduction to Forestry	1	1	2	100
4.	BSAC-105	Comprehension & Communication Skills in English	1	1	2	100
5.	BSAC-106	Fundamentals of Agronomy	3	1	4	100
6.	BSAR-107	Introductory Biology*/Elementary Mathematics*	1/2	1/0	2/2	100
7.	BSAR-108					
7.	BSAR-109	Agricultural Heritage*	1	0	1	100
8.	BSAC-110	Rural Sociology & Educational Psychology	2	0	2	100
9.	BSAN-111	Human Values & Ethics (non gradial)	1	0	1	100
10.	BSAN-112/ BSAN-113/ BSAN-114	NSS/NCC/Physical Education & Yoga Practices**	0	2	2	100
Total	Number of Courses	C:Core Courses(07) *R:Remedial Course(02); **N:Non gradial course(02)	Course wise Total credits C:18, R:03, N:03=24			

Semester-II

S.No	Course Code	Course Title	Credit Distribution			MM
			T	P	Total	
1.	BSAC-201	Fundamentals of Genetics	2	1	3	100
2.	BSAC-202	Agricultural Microbiology	1	1	2	100
3.	BSAC-203	Soil and Water Conservation Engineering	1	1	2	100
4.	BSAC-204	Fundamentals of Crop Physiology	1	1	2	100
5.	BSAC-205	Fundamentals of Agricultural Economics	2	0	2	100
6.	BSAC-206	Fundamentals of Plant Pathology	3	1	4	100
7.	BSAC-207	Fundamentals of Entomology	3	1	4	100
8.	BSAC-208	Fundamentals of Agricultural Extension Education	2	1	3	100
9.	BSAC-209	Communication Skills and Personality Development	1	1	2	100


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10.Human Value and Ethics**Course Code BSAN-111****1(1+0)****Theory**

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body. Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

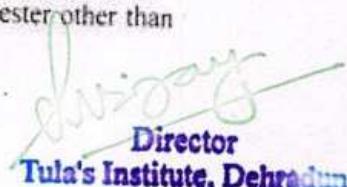
11.NSS/NCC/Physical Education & Yoga Practices**Course Code- BSAN-112****2(0+2)****Theory**

Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skilful in executing democratic leadership, developing skill in programme development to be able for self employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Following activities are to be taken up under the NSS course:

- Introduction and basic components of NSS: Orientation
- NSS programmes and activities
- Understanding youth
- Community mobilisation
- Social harmony and national integration
- Volunteerism and shramdan
- Citizenship, constitution and human rights
- Family and society
- Importance and role of youth leadership
- Life competencies
- Youth development programmes
- Health, hygiene and sanitation
- Youth health, lifestyle, HIV AIDS and first aid
- Youth and yoga
- Vocational skill development
- Issues related environment
- Disaster management
- Entrepreneurship development
- Formulation of production oriented project
- Documentation and data reporting
- Resource mobilization
- Additional life skills
- Activities directed by the Central and State Government

All the activities related to the National Service Scheme course is distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV each having one credit load. The entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than



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10.	BSAN-110/ BSAN-111/ BSAN-112	NSS/NCC/Physical Education & Yoga Practices**	0	2	2	100
Total Number of Courses	C:Core Courses(09)	*R:Remedial Course(Nil);**N:Non gradial course(Nil)		Course wise Total credits C:24, R:02, N:Nil=26		

Semester -III

S.No	Course Code	Course Title	Credit Distribution			
			T	P	Total	MM
1.	BSAC-301	Crop Production Technology – I (<i>Kharif Crops</i>)	1	1	2	
2.	BSAC-302	Fundamentals of Plant Breeding	2	1	3	
3.	BSAC-303	Agricultural Finance and Cooperation	2	1	3	
4.	BSAC-304	Agri- Informatics	1	1	2	
5.	BSAC-305	Farm Machinery and Power	1	1	2	
6.	BSAC-306	Production Technology for Vegetables and Spices	1	1	2	
7.	BSAC-307	Environmental Studies and Disaster Management	2	1	3	
8.	BSAC-308	Statistical Methods	1	1	2	
9.	BSAC-309	Livestock and Poultry Management	3	1	4	

Total Number of Courses C:Core Courses(09) *R:Remedial Course(Nil);**N:Non gradial course(Nil)

Course wise Total credits

C:23, R:Nil, N:Nil

Semester-IV

S.No	Course Code	Course Title	Credit Distribution			
			T	P	Total	MM
1.	BSAC-401	Crop Production Technology –II (<i>Rabi Crops</i>)	1	1	2	100
2.	BSAC-402	Production Technology for Ornamental Crops, MAP and Landscaping	1	1	2	100
3.	BSAC-403	Renewable Energy and Green Technology	1	1	2	100
4.	BSAC-404	Problematic Soils and their Management	2	0	2	100
5.	BSAC-405	Production Technology for Fruit and Plantation Crops	1	1	2	100
6.	BSAC-406	Principles of Seed Technology	2	1	3	100
7.	BSAC-407	Farming System & Sustainable Agriculture	1	0	1	100

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Familiarization with different inter-cultivation equipment. Familiarization with harvesting and threshing machinery.

6-Production Technology for Vegetable and SpicesCourse Code- BSAC-306

2(1+1)

Theory

Importance of vegetables & spices in human nutrition and national economy, kitchen gardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable and spices (Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas; Cole crops such as Cabbage, Cauliflower, Knol-khol; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Raddish, Beetroot; Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak, Perennial vegetables).

Practical

Identification of vegetables & spice crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizers applications. Harvesting & preparation for market. Economics of vegetables and spices cultivation.

7-Environmental Studies and Disaster ManagementCourse Code- BSAC3073(2+1)

Theory

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

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Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. **Solid Waste Management:** causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

Social Issues and the Environment: From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Human Population and the Environment: population growth, variation among nations, population explosion. Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS, Women and Child Welfare. Role of Information Technology in Environment and human health.

Disaster Management

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves. Climatic change: global warming, Sea level rise, ozone depletion.

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community -based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response: Police and other organizations.

Practical

Pollution case studies. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain, visit to a local polluted site- Urban/Rural/Industrial/Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

8-Statistical Methods

Course Code- BSAC-308

2(1+1)

Theory

Introduction to Statistics and its Applications in Agriculture. Graphical Representation of Data. Measures of Central Tendency & Dispersion, Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions. Definition of Correlation, Scatter Diagram, Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2×2 Contingency Table. Introduction to Analysis of Variance. Analysis of One Way Classification. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample.

Practical

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped

experiments of rabi crops at experimental farms. Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

2-Production Technology for Ornamental Crops, MAPs and Landscaping Course Code-BSAC-402 2(1+1) Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, lily and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Practical

Practical:
Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

3-Renewable Energy and Green Technology Course Code- BSAC-403 2(1+1)

Theory

Classification of energy sources, contribution of these of sources in agricultural sector. Familiarization with biomass utilization for biofuel production and their application. Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application. Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants. To study gasifier. To study the production process of biodiesel. To study briquetting machine. To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker. To study solar drying system. To study solar distillation and solar pond.

4-Problematic Soils and their Management Course Code- BSAC-404 2(2+0)

Theory

Theory: Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Irrigation water - quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils.

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

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B. Com. (Hons.): Three-Year (6-Semester)
Course Structure

B. Com (Hons.) Semester I:

S. No.	Course Code	Course Name	Marks		Duration (Hrs.) (External)
			External	Internal	
1	BCH-1.1	Environmental Studies	70	30	3
2	BCH-1.2	Financial Accounting	70	30	3
3	BCH-1.3	Business Law	70	30	3
4	BCH-1.4	Micro Economics	70	30	3
5	BCH-1.5	Principles and Practices of Management	70	30	3
6	BCH-1.6	Business Environment	70	30	3



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B.Com. (Hons.): Semester - I

Paper – BCH 1.1 : ENVIRONMENTAL STUDIES

Assessment: Internal 30 marks , End semester exam of three hours 70 marks

Objective: To familiarize the students with the vulnerabilities of the environment and help them work in a manner which is environment friendly.

CONTENTS

Unit 1: Introduction to Environmental Sciences

Multidisciplinary nature of Environmental Sciences; Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Ecosystems

What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3: Natural Resources: Renewable and Non-renewable Resources

Land resources and land use change; Land degradation, soil erosion and desertification.

Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.

Water: Use and over exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).

Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs.

Unit 4: Biodiversity and Conservation

Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity ;Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 5: Environmental Pollution

Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste; Pollution case studies.

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ENVIRONMENT SCIENCE

BBA-206

Objective: To familiarize the students with the vulnerabilities of the environment and help them work in a manner which is environment friendly.

CONTENTS

Unit 1: Introduction to Environmental Sciences

Multidisciplinary nature of Environmental Sciences; Scope and importance; Concept of sustainability and sustainable development.

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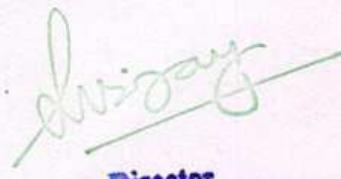
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Unit 5: Environmental Pollution

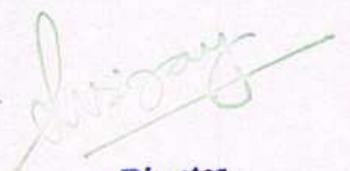
Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste; Pollution case studies.



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MCA 3rd Semester

S. No.	Sub. Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours/Week			Total Credits
			Theory		Practical				L	T	P	
End Sem.	Mid Sem.	Teachers Assessments	End Sem.	Lab Work & Sessional								
1	MCAT 301	Theory of Automata and Formal Language	100	30	20			150	3	1		4
2	MCAT 302 MCAP 302	Software Engineering	100	30	20	30	20	200	3	1	2	5
3	MCAT 303 MCAP 303	Big Data Analysis	100	30	20	30	20	200	3	1	2	5
4	MCAT 304	Artificial Intelligence & Applications	100	30	20			150	3	1		4
5	MCAT 305	Combinatorics and Graph Theory	100	30	20			150	3	1		4
6	MCAT 306	Universal Human Values	70	20	10			100	2			2
7	MCAT 307	Any Online Course specified by AICTE on latest technology Not Credit Course – must be completed (in 2 nd Year) to award the MCA Degree						Total	1000			25



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MCAT 306	Universal Human Values	L 2 : T 0 : P 0	2 Credits
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Need, Basic Guidelines, Content And Process For Value Education:

Understanding the need, basic guidelines, Self Exploration-its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity- Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understand in gland living in harm on yet various levels

Understanding Harmony in the Human Being- Harmony in Myself:

Understanding human being as co-existence of the sent isn't 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body'-Sukh and Suvidha. Understanding the Body as an instrument of 'I', 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.

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

Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubbhay-tripti; Trust (Vishwas) and Respect (Samman), meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation; the other salient value in relationship, harmony in the society, Samadhan, Samridhi, Abhay, Sahastava as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyavastha)-from family to world family.

Understanding Harmony in the Nature and Existence- Whole Existence as Coexistence:

Understanding the harmony in the Nature. Inter connectedness and mutual fulfillment among the four order so nature-recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiava) of mutually interacting units in all pervasive Space. Holistic perception of harmony at all levels of existence.

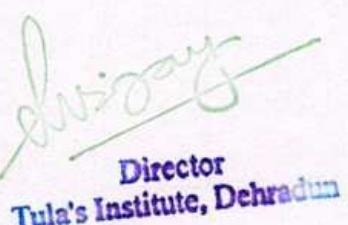
Implications of the Above Holistic Understanding of Harmony on Professional Ethics – Natural Acceptance of Human Values:

Definiteness 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. Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers. Case studies related to values in professional life and individual life.

Suggested Readings:

1. R.R.Gaur, RSangal, GP Bagaria, A Foundation Course in Human Values and Professional Ethics, Excel Books, 2009. ISBN: 978-9-350-62091-5
2. R. Subramanian, Professional Ethics includes Human Values, Oxford Univ. Press.
3. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
4. MGovindrajan, SNatrajan & V.S.Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
5. BP Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
6. BL Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.



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MBA -INTEGRATED (Curriculum)-5 Year Full Time

S.No	Paper Name	Credit Point	UU.Th	Marks Distribution Int.Th.
I Semester				
MAM 101	Management Concepts and Practices	4	100	50
MAM 102	Environment Management	4	100	50
MAM 103	Fundamentals of Business Statistics	4	100	50
MAM 104	Computer Application in Business	4	100	50
MAM 105	Fundamentals of Accounting	4	100	50
MAM 106	Fundamental of Business Analysis Techniques	4	100	50
MAM 107	English (Qualifying)			
II Semester				
MAM 201	Management Accounting	4	100	50
MAM 202	Business Economics-I	4	100	50
MAM 203	Business Environment	4	100	50
MAM 204	Indian Ethos and Values	4	100	50
MAM 205	Information Technology in Business	4	100	50
MAM 206	Business Communication and Technology Interface	4	100	50
III Semester				
MAM 301	Organizational Behaviour	4	100	50
MAM 302	Business Economics-II	4	100	50
MAM 303	Fundamentals of Financial Management	4	100	50
MAM 304	Fundamentals of Human Resource Management	4	100	50
MAM 305	Fundamentals of Marketing Management	4	100	50
MAM 306	Startup Planning and Professional Development	4	100	50
IV Semester				
MAM 401	Quantitative Techniques	4	100	50
MAM 402	Cost Accounting	4	100	50
MAM 403	Corporate Legal Environment	4	100	50
MAM 404	Research Methodology	4	100	50
MAM 405	Entrepreneurship Development and SME	4	100	50
MAM 406	Advanced Business Analysis Techniques	4	100	50
V Semester				
MAM 501	Strategic Management	4	100	50
MAM 502	Event Management	4	100	50
MAM 503	Labour Legislation	4	100	50
MAM 504	Corporate Governance	4	100	50
MAM 505	Marketing of Services	4	100	50
MAM 506	Simulated Consultancy Project	4	100	50

MAM 102 : Environment Management

Objective: The course shall provide the students with an exposure of environmental problems and issues in a scientific framework, developing methodologies to solving problems and ultimately to master the manner of systematic implementation of existing environmental policies in achieving sustainable development. The main approach is to focus on the environmental management and to illustrate some of the ways in which we can protect our environment in a managed way.

UNIT 1 Basics of Environment Management

Implications of human population growth, Limits to growth, Natural resources-Renewable and Non Renewable sources; associated problems, Role of an individual in conservation of natural resources, Sustainable development, Concept of an Ecosystem, Ecosystem degradation, Industrial Ecology and Recycling Industry. Biodiversity Management, Role of Biodiversity in trade.

UNIT 2 Environmental Management System

EMS standards: ISO 14000, Environmental Auditing, Clearance/Permissions for establishing industry, Environmental Management & Valuation, Environmental Economics, Environmental Taxes Shifts, Green Funding, Environmental Ethics, Environmental Law Implementation.

UNIT 3 Major Environmental Issues

Construction of dams: problems and concerns of rehabilitation of affected people; resources consumption patterns and need for equitable utilization; Equity disparity in western and eastern countries; Urban and rural equity issues; Concept of Bio-Ethics. Air, Water, Land & Waste Management: Introduction, Impact on health, environmental and industry, Measures of control, Individual contribution. Green House Effect, Global Warming, Acid Rain, Rain Water Harvesting, Ozone Layer depletion.

UNIT 4 Environmental Laws

Environmental (protection) Act, The water (prevention and control of Pollution); Issues involved in enforcement of environmental legislations; Environmental Impact Assessment; Environmental Auditing; Central Pollution Control Boards, State Pollution Control Boards, Local Bodies.

UNIT 5 Environmental Liabilities

Criminal wrongs and the environment, Law of Torts (civil wrong) and the environment, Strict and absolute liabilities.

Text Book

1. Bala Krishnamoorthy, - Environmental Management Prentice Hall India.

Reference Books

1. NK Uberoi Environment Management, Excel Books, New Delhi.
2. Pandey, G.N. – Environment Management, Vikas Publishing House, New Delhi, 1997.
3. Mohanty, S.K. Environmental and Pollution Law Manual, Universal Law Pub., New Delhi 1996.

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