NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.TECH. / INSTRUMENTATION AND CONTROL ENGINEERING		
Course Title	Energy and Environmental Engineering		
Course Code	ENIR 11	No. of Credits	2
Course Code of Pre-requisite subject(s)	Nil		
Session	January 2019	Section (if, applicable)	A and B
Name of Faculty	Ms. K. Lakshmi	Department	ICE
Official Email	lakshmik@nitt.edu	Telephone No.	
Name of Course Coordinator(s) (if, applicable)	Nil		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	☒ Core course	☐ Elective course	

Syllabus (approved in BoS)

Present Energy resources in India and its sustainability - Different type of conventional Power Plant--Energy Demand Scenario in India-Advantage and Disadvantage of conventional Power Plants – Conventional vs Non-conventional power generation

Basics of Solar Energy- Solar Thermal Energy- Solar Photovoltaic- Advantages and Disadvantages- Environmental impacts and safety.

Power and energy from wind turbines- India's wind energy potential- Types of wind turbines- Off shore Wind energy- Environmental benefits and impacts.

Biomass resources-Biomass conversion Technologies- Feedstock preprocessing and treatment methods- Bioenergy program in India-Environmental benefits and impacts. Geothermal Energy resources –Ocean Thermal Energy Conversion – Tidal.

Air pollution- Sources, effects, control, air quality standards, air pollution act, air pollution measurement. Water pollution-Sources and impacts, Soil pollution-Sources and impacts, disposal of solid waste.

Greenhouse gases – effect, acid rain. Noise pollution. Pollution aspects of various power plants. Fossil fuels and impacts, Industrial and transport emissions- impacts.

COURSE OBJECTIVES

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO)
Students will be introduced to the Principal renewable energy systems and explore the environmental impact of various energy sources and also the effects of different types of pollutants.	1, 3 & 8

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COURSE PLAN – PART II

COURSE OVERVIEW

This course is about various conventional and non-conventional sources of energy. It also explains the present energy demand scenario in India, impacts of conventional energy(non-renewable) resources on environment and the need for renewable and sustainable forms of energy resources.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Contact Hours	Topic	Mode of Delivery
1	1	Introduction	C & T
2	2	Present Energy resources in India and its sustainability	PPT
3	3	Different types of conventional Power Plant- Thermal	PPT
4	4	Hydel power plant and Diesel power plant	PPT
5	5	Nuclear power plant	PPT
6	6	Energy Demand Scenario in India- Advantages and disadvantages of conventional power plants	PPT
7	7	Conventional Vs Nonconventional power plants	PPT
8	8	Basics of Solar Energy- Solar Geometry	PPT
9	9	Solar Thermal plant- Types- Parabolic Troughs- Parabolic dishes- Linear Fresnel collector- Solar tower	PPT
10	10	Solar Photovoltaic system- Types- Components in photovoltaic system	PPT
11	11	Advantages and Disadvantages-Environmental Impacts And Safety	PPT
12	12	Power and energy from wind turbines- Types- Onshore plants	PPT
13	13	Off- shore wind power plants	PPT
14	14	India's wind energy potential	PPT
15	15	Environmental benefits and Impacts of wind power plants	PPT
16	16	Biomass resources-Biomass conversion Technologies	PPT
17	17	Feedstock preprocessing and treatment methods	PPT
18	18	Bioenergy program in India-Environmental benefits and impacts.	PPT
19	19	Geothermal Energy resources	PPT

20	20	Tidal power plants- Types	PPT
21	21	Ocean Thermal Energy Conversion	PPT
22	22	Air pollution- Sources, effects, control, air quality standards, air pollution act	PPT
23	23	Air pollution measurement techniques	PPT
24	24	Water pollution-Sources and impacts	PPT
25	25	Soil pollution-Sources and impacts, disposal of solid waste.	PPT
26	26	Greenhouse gases – effect, acid rain. Noise pollution.	PPT
27	27	Pollution aspects of various power plants. Fossil fuels and impacts, Industrial and transport emissions- impacts.	PPT

ESSENTIAL READINGS

Text Books

1. Boyle, G. 2004.' Renewable energy: Power for a sustainable future'. Oxford University press. 2. B H Khan, 'Non-Conventional Energy Resources'-The McGraw –Hill Second edition.
2. G. D. Rai, 'Non-conventional energy sources', Khanna Publishers, New Delhi, 2006.
3. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd Edition, Prentice Hall, 2003.

References

1. 'Unleashing the Potential of Renewable Energy in India' –World bank report.
2. Godfrey Boyle, Bob Everett and Janet Ramage.2010. 'Energy Systems and Sustainability. Power for a sustainable future'. Oxford University press.

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Assessment I (Written)	IV	1 hour	20
2	Assessment II (Written)	VIII	1 hour	20
3	Surprise Quiz/ Assignment	---	--	20
CPA	Compensation Assessment	XIV	1 hour	20
4	Final Assessment	XV	2 hour	40

COURSE EXIT SURVEY

Direct feedback from the student and also feedback of the students from the class committee meeting will be used to access the course.

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COURSE POLICY

- Relative grading will be used to award the marks
- One compensation assessment/ retest will be conducted after Assessment II for the students who absent the any of the internal assessments. The portion for the compensation assessment will be Assessment I and Assessment II portions both together.
- The passing minimum for this course 35% or Class average/2 whichever is greater.
- Students who fail in the course and those who absent for the final assessment has to write Reassessment provided that they had satisfied 75% attendance requirement. Only one reassessment will be conducted.
- Student fail in Reassessment has to do the course formative assessment only.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- The minimum attendance for passing this course is 75%
- However, 5 % of relaxation can be considered for OD and on genuine medical grounds
- Students with less than 75% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.
- Students who have less than 75% have to Redo the course.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

Course Faculty 31/01/19 CC- Chairperson 4/2/19 HOD 4/2/19

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