

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Course Title	ENERGY AND ENVIRONMENTAL ENGINEERING		
Course Code	ENIR11	No. of Credits	2
Course Code of Pre-requisite subject(s)	--		
Session	July/ Jan. <u>2018</u>	Section (if, applicable)	A/ B
Name of Faculty	Ms.S.MALARVILI	Department	EEE
Email	--	Telephone No.	--
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
<b>Syllabus (approved in BoS)</b>			
<p>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.</p> <p>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.</p> <p>Biomass resources-Biomass conversion Technologies- Feedstock preprocessing and treatment methods- Bio energy program in India-Environmental benefits and impacts. Geothermal Energy resources –Ocean Thermal Energy Conversion – Tidal.</p> <p>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</p>			
<b>COURSE OBJECTIVES</b>			
This course is designed to learn the principles of renewable energy systems and to explore the environmental impact of various energy sources and also the effects of different types of pollutants.			
<b>COURSE OUTCOMES (CO)</b>			
Course Outcomes	Aligned Programme Outcomes (PO)		
1. To learn the principles of renewable energy systems	PO <sub>1</sub> , PO <sub>8</sub> , PO <sub>12</sub> – PO <sub>14</sub>		
2. To explore the environmental impact of various energy sources and also the effects of different types of pollutants.	PO <sub>1</sub> , PO <sub>8</sub> , PO <sub>12</sub> – PO <sub>14</sub>		



**COURSE PLAN – PART II**

**COURSE OVERVIEW**

This course is intended to provide students with a thorough grounding in engineering principles and concepts and apply this to energy and environmental (E&E) problems. Energy Engineering involves studying current forms of power generation as well as, developing technologies in the field of power generation. These forms of energy need to be used efficiently so that in the future we use less energy while continuing to fulfill the needs of society. Environmental Engineering is about continuing to reduce and eliminate the harmful impacts that man has on the environment. This involves looking at methods that can be used to control air, water and noise pollution while understanding the principles behind how the pollution control technologies work.

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	II week of January (8 <sup>th</sup> & 12 <sup>th</sup> ) 2 hrs	Introduction to the course and present energy resources in India and its sustainability, Different type of conventional power plant	
2	III week of January (16 <sup>th</sup> & 19 <sup>th</sup> ) 2 hrs	Energy demand scenario in India, Advantages and disadvantages of conventional power plants, conventional Vs Non-conventional power generation.	
3	IV week of January (23 <sup>rd</sup> – 30 <sup>th</sup> ) 2 hrs	Basics of solar energy, Solar thermal energy and solar photovoltaic	<b>Lecture(Chalk&amp;board / Power point presentation)</b>
4	I week of February (2 <sup>nd</sup> ) 1 hr	Advantages and Disadvantages- Environmental impacts and safety	
5	II week of February (6 <sup>th</sup> & 9 <sup>th</sup> ) 2 hrs	Power and energy from wind turbines, India's wind energy potential	
6	III week of February (13 <sup>th</sup> & 16 <sup>th</sup> ) 3 hrs	Types of wind turbines, Off shore wind energy, Environmental benefits and impacts	
7	20 <sup>th</sup> February	<b>Assessment 1</b>	<b>Objective &amp; Descriptive type</b>



8	IV week of February (27 <sup>th</sup> ) 1 hr	Biomass resources, Biomass conversion technologies, Feedstock processing and treatment methods.	Lecture(Chalk&board / Power point presentation)
9	II week of March (6 <sup>th</sup> & 9 <sup>th</sup> ) 2 hrs	Bio energy program in India, Environmental benefits and impacts, Geothermal Energy resources, Ocean thermal Energy conversion, Tidal	
10	III week of March (13 <sup>th</sup> & 16 <sup>th</sup> ) 2 hrs	Air pollution- Sources, effects, Control, air quality standards, air pollution act, air pollution measurement	
11	IV week of March (20 <sup>th</sup> & 23 <sup>rd</sup> ) 2 hrs	Water pollution- Sources and impacts, Soil pollution- Sources and impacts, disposal of solid waste.	
12	27 <sup>th</sup> March	<b>Assessment 2</b>	<b>Objective &amp; Descriptive Type</b>
13	I week of April (3 <sup>rd</sup> & 6 <sup>th</sup> ) 2 hrs	Greenhouse gases – Effect, acid rain. Noise pollution. Pollution aspects of various power plants.	Lecture(Chalk&board / Power point presentation)
14	II week of April (10 <sup>th</sup> ) 1 hr	Fossil fuels and impacts, Industrial and transport emissions – impacts.	Lab(Practical experimentation)

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle test- 1	20 <sup>th</sup> February	1 hour	20
2	Cycle test- 2	27 <sup>th</sup> March	1 hour	20
3	Assignment			10
CPA	Compensation Assessment*	13 <sup>th</sup> April	1 hour	20
6	Final Assessment *	Month of April	3 hours	50

**\*mandatory; refer to guidelines on page 4**



**ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc**

1. Boyle, G. ' Renewable Energy: Power for a Sustainable Future', Oxford University Press, 2004.
2. B H Khan, 'Non Conventional Energy Resources' The McGraw –Hill Second Edition.
3. G. D. Rai, 'Non Conventional Energy Sources', Khanna Publishers, New Delhi, 2006.
4. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd Edition, Prentice Hall, 2003.

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)**

1. Student's feedback through Class – Committee Meetings
2. Anonymous feedback from students using questionnaire

**COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)**

**ATTENDANCE**

1. Every student should maintain 75% attendance, if not they have to redo the course.
2. Students who have missed the regular lab class should get the prior permission for attending compensation lab class

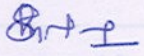
**ACADEMIC HONESTY & PLAGIARISM**

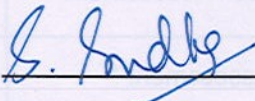
1. All the students are expected to be genuine during the course work. Taking information by copying another student's paper or using study material of any form during any assessments is considered dishonest.
2. Any evidence of such academic dishonesty will result in loss of marks in that assessment. Additionally names of such students will be reported to Class Committee Chairperson and HOD for necessary actions.
3. Students who honestly produce ORIGINAL and OUTSTANDING work will be rewarded

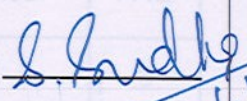
**ADDITIONAL INFORMATION**

1. The Course Coordinator is available for consultation during the time intimated to the students then and there.
2. All correspondence will be sent to webmail id of the students alone. Hence all students are advised to check their webmail regularly.

**FOR APPROVAL**

Course Faculty 

CC-Chairperson 

HOD   
29/1/18



**Guidelines:**

- a) The number of assessments for a course shall range from 4 to 6.
- b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**
- c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. This is not applicable for project work/industrial lectures/internship.**
- d) The policy for attendance for the course should be clearly specified.
- e) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.