NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ENERGY AND ENVIRONMENT

COURSE PLAN – PART I			
Name of the programme and specialization	**M. Tech – Energy Engineering**		
Course Title	**Energy and Environmental Engineering Laboratory**		
Course Code	**EN607**	**No. of Credits**	**1**
Course Code of Pre-requisite subject(s)	**-**		
Session	**JULY 2021**	**Section (if, applicable)**	**-**
Name of Faculty	**Dr. D. Ruben Sudhakar Dr. Godwin Glivin**	**Department**	**Energy and Environment**
Official Email	**rubensudhakar@nitt.edu**	**Telephone No.**	**+91 94812 08902**
Name of Course Coordinator(s) (if, applicable)	**NA**		
Official E-mail		**Telephone No.**	
Course Type (please tick appropriately)	☑ **Core course Laboratory** ☐ **Elective course**		

Syllabus (approved in BoS)

- Determination of Chemical oxygen demand (COD, O_2 eq. mgL^{-1}) of the given wastewater sample
- Determination of Bio-chemical oxygen demand (BOD, O_2 eq. mgL^{-1}) of the given wastewater sample
- Measurement of pH, electrical conductivity, salinity and total solids of given water samples
- Measurement of reduction in level of ambient noise by noise-absorbing material using noise dosimeter
- Determination of luminous efficacy of various light sources using lux meter
- Thermal analysis: heat loss through circular pipe - with/without insulation using infrared thermometer
- Energy logger: energy consumption of an electrical utility with respect to different load
- Flat plate collector
- Evacuated tube collector
- Solar PV panel characterization: Series and parallel connection
- Solar still
- Parabolic trough collector
- Electrochemical work station: Battery – discharging and charging characteristics

COURSE OBJECTIVES

- To conduct experiment for the theoretical concepts of energy and environmental engineering.
- To familiarize students to analyze the data collected from experimental setups thereby getting practical exposure and developing problem solving skills.
- To enable the students to draw conclusion/inference from the data and validate it.

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
At the end of the course, student will be able to (i) measure and compare the direct and diffused beam solar radiation. (ii) determine the V-I characteristics of photovoltaic panel. (iii) study the performance of flat plate collector. (iv) estimate the drying rate of solar dryer. (v) measure pH, Dissolved oxygen and electrical conductivity of different water/wastewater. (vi) quantify the organic content of various water/waste water using COD and BOD methods. (vii) estimate the total solids of various water/wastewater (viii) measure the ambient air quality in the perspective of sound and Dust, and to compare with Indian air quality standards. (ix)To compare the luminous intensity of different light sources	PO 1-12

COURSE PLAN – PART II

COURSE OVERVIEW

COURSE TEACHING AND LEARNING ACTIVITIES (Add more rows)

S. No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Determination of Chemical oxygen demand (COD, O_2 eq. mgL^{-1}) of the given wastewater sample	Practical
2	Week 2	Measurement of pH, electrical conductivity, salinity and total solids of given water samples	Practical
3	Week 3	Determination of luminous efficacy of various light sources using lux meter	Practical

4	Week 4	Measurement of reduction in level of ambient noise by noise-absorbing material using noise dosimeter	Practical
5	Week 5	Determination of Bio-chemical oxygen demand (BOD, O_2 eq. mgL^{-1}) of the given wastewater sample	Practical
6	Week 6	Thermal analysis: heat loss through circular pipe - with/without insulation using infrared thermometer	Practical
7	Week 7	Energy logger: energy consumption of an electrical utility with respect to different load	Practical
8	Week 8	Flat plate collector	Practical
9	Week 9	Evacuated tube collector	Practical
10	Week 10	Solar PV panel characterization: Series and parallel connection	Practical
11	Week 11	Solar still	Practical
12	Week 12	Parabolic trough collector	Practical
13	Week 13	Solar chimney: natural draft and forced draft	Practical
14	Week 14	Electrochemical work station: Battery – discharging and charging characteristics	Practical

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	On-time submission of laboratory observation notebooks	1- 14	1 week per experiment	60
2.	End semester – Written exam/viva-voice			40

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

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Feedback form will be collected from the students by the institute through student's MIS Portal.

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDANCE (E-mail/phone)

Students can meet me in my office (MN 103, DEE building) or email me at rubensudhakar@nitt.edu

COMPENSATION ASSESSMENT POLICY

Compensation lab sessions will be conducted only for students who miss laboratory classes on valid/genuine reasons of medical or other emergencies.

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

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

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.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

Text Books and Reference

1.D. Yogi Goswami, Frank Kreith, Jan. F. Kreider, "Principles of Solar Engineering", 2nd Edition, Taylor & Francis, 2000, Indian reprint, 2003

2.Edward E. Anderson, "Fundamentals for solar energy conversion", Addison sleyPubl. Co., 1983.

3. *George Tchobanoglous and Metcalf & Eddy, 'Wastewater Engineering Treatment disposal and Reuse 4th Edition.*
4. *B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, "Wastewater Engineering", 3rd Edition,Phantom publ.*

FOR APPROVAL

Course Faculty _____ **CC- Chairperson** _____ **HOD** _____

Guidelines

a) The number of assessments for any theory course shall range from 4 to 6.

b) Every theory 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. Only genuine cases of absence shall be considered.

d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.