



# NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

## DEPARTMENT OF ENERGY & ENVIRONMENT

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech (Energy Engineering)		
Course Title	ENERGY AUDIT AND MANAGEMENT		
Course Code	EN 606	No. of Credits	3
Course Code of Pre-requisite subject(s)	UG– Chem/Mec/EEE/BT/Met		
Session	January-May 2023	Section (if, applicable)	N.A
Name of Faculty	Dr.A.K.Bakthavatsalam	Department	Energy & Environment
Official Email	baktha@nitt.edu	Telephone No.	9486001174
Name of Course Coordinator(s) (if, applicable)			
Official E-mail			Telephone No.
Course Type (please tick appropriately)	<input type="checkbox"/> Core course <input type="checkbox"/> Elective course Core for M.Tech(Energy) and Elective for M.Tech-Chem/ Thermal/ Safety/ Power System/ Env Eng		
<b>Syllabus (approved in Senate)</b>			
<b>COURSE OBJECTIVES</b>			
<ul style="list-style-type: none"> <li>To understand the overall energy scenario and the role of energy managers in industries.</li> <li>To nudge the student to appreciate real life engineering is indeed inter and multi-disciplinary.</li> <li>To understand the energy audit and management of equipment and processes</li> </ul>			
<b>MAPPING OF COs with POs</b>			
<b>Course Outcomes</b>			<b>Programme Outcomes (PO) (Enter Numbers only)</b>
After successfully completing this course, the student will be able to			
1. Appreciate the role of energy managers in industries carrying out energy monitoring, auditing and targeting.			1,3,6,7,8
2. Elaborate principles of steam engineering with application of associated equipment like steam traps.			3,7,8,12
3. Frame energy conservation measures in systems involving pumps, fans, blowers, compressors, cooling systems including cooling towers etc			3,7,8,12



**COURSE PLAN – PART II**

**COURSE OVERVIEW**

Energy consumption pattern in industrial establishments has been drawing increasing attention during last decade from a twin perspective of (a) cost of energy and (b) environmental impact that is caused by the consumption of this energy. The Government of India has enacted The Energy Conservation Act 2001 and has set-up a separate bureau called the Bureau of Energy Efficiency (BEE). The Act mandates reporting of energy consumption in the annual report of certain industries termed as designated consumers. Energy audit & management is an important and integral part of a master's program on Energy Engineering. Exposure to this course will enable a student to pursue a career as energy auditor. Energy being inter and multi-disciplinary, so is this course on Energy Audit & Management. The course is largely application oriented, moving a few notches above text book theory. Students would be required acquire basic knowledge of mechanical / electrical / chemical engineering to understand the energy audit and management of equipment and processes

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	I-IV	Introduction, forms of energy, level of flow, CUSUM plots, Energy Audit methodology, benchmarking, Balanced production ratio, boiler specifications, types and efficiency calculations	Chalk and talk, PPT, practical exposure and snippet talks by students
2	V-VIII	Course on steam engineering – traps, flash steam calculations, piping, sizing. Functioning of moving equipment that consume energy.	Chalk and talk, PPT, practical exposure and snippet talks by students
3	IX-XII	Energy efficiency in moving equipment like fans, blowers, pumps, compressors. Best efficiency point (BEP), flow control, cooling towers.  Tasks to students encompassing snippet presentations, team activity etc	Chalk and talk, PPT, practical exposure and snippet talks by students

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

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Class test based on class room teaching	IV	60 min	20
2	Class test based on class room teaching	VIII	60 min	20
3	Snippet presentation & submission on assigned topic and own preparation (copy paste from internet not acceptable)	X	20-30 min	10



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CPA	Compensation Assessment*	IX	60 min	20
4	Final Assessment: End semester based on class room teaching, snippet presentations, practical exposure	XII	180 min	50
<b>*mandatory; refer to guidelines on page 5</b>				
<b>COURSE EXIT SURVEY</b> (mention the ways in which the feedback about the course shall be assessed)				
Feedback from the students during class committee meetings				
<b>COURSE POLICY</b> (including compensation assessment to be specified)				
<p><b><u>MODE OF CORRESPONDENCE (email/ phone etc)</u></b> Faculty is available for consultation at any time. Class is encouraged to form a group mail id / WhatsApp group for effective communication.</p> <p><b><u>COMPENSATION ASSESSMENT</u></b> One compensation assessment will be held in 9<sup>th</sup> week with a weightage of 20%</p>				
<p><b><u>ATTENDANCE POLICY</u></b> (A uniform attendance policy as specified below shall be followed)</p> <ul style="list-style-type: none"> <li>➤ At least 75% attendance in each course is mandatory.</li> <li>➤ A maximum of 10% shall be allowed under On Duty (OD) category.</li> <li>➤ Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.</li> </ul>				
<p><b><u>ACADEMIC DISHONESTY &amp; PLAGIARISM</u></b></p> <ul style="list-style-type: none"> <li>➤ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.</li> <li>➤ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.</li> <li>➤ 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.</li> <li>➤ The above policy against academic dishonesty shall be applicable for all the programmes.</li> </ul>				



**ADDITIONAL INFORMATION, IF ANY**

The course is heavily orientated towards practical energy audit and hence students are required to rise above pure text book knowledge.

**FOR APPROVAL**

Course Faculty \_\_\_\_\_ CC- Chairperson M. Mathan HOD [Signature]



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### Guidelines

- The number of assessments for any theory course shall range from 4 to 6.
- Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- 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%

- Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- Necessary care shall be taken to ensure that the course plan is reasonable and is objective.