



**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. / Electrical and Electronics Engineering		
Course Title	UTILIZATION OF ELECTRICAL ENGINEERING		
Course Code	EEPE21	No. of Credits	3
Course Code of Pre-requisite subject(s)	EEPC15		
Session	July 2022	Section (if, applicable)	A&B
Name of Faculty	P. RAJA	Department	EEE
Email	eeu.raja@gmail.com	Telephone No.	0431-250 3264 9942680653
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	NA	Telephone No.	NA
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>illumination – Terminology, Laws of illumination, Photometry, lighting calculations. Electric lamps –Different types of lamps, LED lighting and Energy efficient lamps. Design of lighting schemes - factory lighting - flood lighting – street lighting.</p> <p>Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Variou types of air conditioning systems and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for more efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.</p> <p>Domestic utilization of electrical energy – House wiring. InInduction-basedppliances, Online and OFF line UPS, Batteries. Power quality aspects – nonlinear and domestic loads. Earthing – domestic, industrial and susubstation</p> <p>Electric Heating- Types of heating and applications, Electric furnaces - Resistance, inductance and Arc Furnaces, Electric welding and sources of welding, Electrolytic processes – electro-metallurgy and eleetroplating</p> <p>Traction system – power supply, traction drives, electric braking, tractive effort calculations and speed-time characteristics. Locomotives and train – rea cent trend in electric traction.</p>			
Text/Reference Books:			
<ol style="list-style-type: none"> 1. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014. 2. Gupta, J.B., 'Utilisation of Electrical Energy and Electric Traction', S. K. Kataria and Sons, 10th Edition, 2012. 3. Rajput R.K., 'Utilisation of Electrical Power', Laxmi Publications, 1st Edition, 2006. 4. N. V. Suryanarayana, 'Utilisation of Electrical Power', New Age International Publishers, Reprinted 2005. 			

5. C. L. Wadhwa, 'Generation Distribution and Utilization of Electrical Energy', New Age International Publishers, 4th Edition, 2011.
6. H. Partab, 'Modern Electric Traction', Dhanpat Rai & Co., 3rd Edition, 2012.
7. Energy Efficiency in Electrical Utilities, BEE Guide Book, 2010.

COURSE OBJECTIVES

This course aims to design illumination systems, choose appropriate motors for any drive application, debug a domestic refrigerator circuit and to design battery charging circuitry for specific applications.

COURSE OUTCOMES (CO)

COs - Aligned Program Outcomes (POs)

Upon completion of the course, the students would be able to

CO1. Develop a clear idea of various illumination techniques and hence design a lighting scheme for specific applications.

CO2. Identify an appropriate method of heating for any particular industrial application

CO3. Evaluate domestic wiring connection and debug any faults that occurred

CO4. Construct an electric connection for any domestic appliance like a refrigerator as well as design a battery charging circuit for a specific household application.

CO5. Realize the appropriate type of electric supply system and to evaluate the performance of the traction unit.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1	-	3	-	-	2	-	-	2	-	2	-	2	1	2
CO2	-	3	-	-	2	-	-	2	-	2	-	2	1	2
CO3	-	3	-	-	2	-	-	2	-	2	-	2	1	2
CO4	-	3	-	-	2	-	-	2	-	2	-	2	1	2
CO5	-	3	-	-	2	-	-	2	-	2	-	2	1	2

COURSE PLAN – PART II

COURSE OVERVIEW

This course primarily deals with the utilization of electrical energy generated from various sources. It is important to understand the technical reasons behind the selection of motors for electric drives based on the characteristics of loads. Electric heating, welding and illumination are some important loads in the industry in addition to motor/drives. Another major share of loads is taken by Electric Traction. In the module of illumination, the selection of lighting schemes and fixtures are numerically dealt. Refrigeration and air-conditioning concepts are briefed in one module, wherein the details of energy efficient motors used also introduced.

In all the five modules of this course, essential emphasis is given to numerical computation. During this course, it is planned to make a hands-on experience with domestic wiring. Moreover, at the end of the course, a relevant industrial visit is planned to get an exposure on electric heating and traction drives.

COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery (On-line – MS TEAMS)
1.	Week 1 16-08-22 to 19-08-22 (2 Contact Hours)	<ul style="list-style-type: none"> Course plan details & General introduction Terminology 	Lecture- PPT
2.	Week 2 22-08-22 to 26-08-22 (3 Contact Hours)	<ul style="list-style-type: none"> Laws of Illumination Lighting Calculation 	Lecture- PPT
3.	Week 3 29-08-22 to 02-09-22 (3 Contact Hours)	<ul style="list-style-type: none"> Different types of electric lamp Design of lighting scheme 	Lecture- PPT
4.	Week 4 05-09-22 to 09-09-22 (3 Contact Hours)	<ul style="list-style-type: none"> Different lighting scheme House wiring Induction-based application 	Lecture- PPT
5.	Week 5 12-09-22 to 16-09-22 (3 Contact Hours)	<ul style="list-style-type: none"> Online & offline UPS Power quality aspects. Non-linear and domestic loads 	Lecture- PPT and hands-on
6.	Week 6 19-09-22 to 23-09-22 (1 Contact Hours)	<ul style="list-style-type: none"> Earthing - Domestic, Industrial, Substation <p style="text-align: center;">QUIZ – I</p>	Lecture Written test
7.	Week 7 26-09-22 to 30-09-22 (3 Contact Hours)	<ul style="list-style-type: none"> Domestic refrigerator and water cooler Air conditioning and its types Smart air conditioning unit 	Lecture- PPT and hands-on
8.	Week 8 03-10-22 to 07-10-22 (3 Contact Hours)	<ul style="list-style-type: none"> Energy efficient motors Standard motors efficiency Need for more efficient motors. Motor life cycle 	Lecture- PPT
9.	Week 9 10-10-22 to 14-10-22 (3 Contact Hour)	<ul style="list-style-type: none"> Direct saving and Payback analysis Efficiency, evaluation factor Electric Heating 	Lecture- PPT
10.	Week 10 17-10-22 to 21-10-22 (1 Contact Hours)	<ul style="list-style-type: none"> Types and applications of electric heating <p style="text-align: center;">QUIZ – II</p>	Lecture- PPT Written test
11.	Week 11 24-10-22 to 28-10-22 (2 Contact Hours)	<ul style="list-style-type: none"> Electric furnace Resistance Inductance and arc furnace 	Lecture- PPT
12.	Week 12 31-10-22 to 04-11-22 (3 Contact Hours)	<ul style="list-style-type: none"> Electric welding and source of welding Electrolytic process Electro-metallurgy and electroplating 	Lecture- PPT
13.	Week 13 07-11-21 to 11-11-22 (2 Contact Hours)	<ul style="list-style-type: none"> Traction system-power supply, traction drives, electric braking 	Lecture- PPT

14.	Week 14 14-11-22 to 18-11-22 (3 Contact Hours)	<ul style="list-style-type: none"> • Traction effort calculations • Speed time characteristics 	Lecture- PPT Industrial visit
15.	Week 15 21-11-22 to 25-11-22 (1 Contact Hours)	<ul style="list-style-type: none"> • Locomotive and train recent trend in electric traction QUIZ - III 	Lecture- PPT Practical Assessment
16.	Week 16 28-11-22 to 30-11-22 (2 Contact Hours)	<ul style="list-style-type: none"> • Locomotive and train recent trend in electric traction 	Lecture- PPT

If any contact hour is NOT handled on a particular day due to unseen reasons, an extra class will be scheduled on the same week based on the time available.

COURSE ASSESSMENT METHODS (shall range from 4 to 6) – ON-line

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Quiz I (Objective NOT MCQ)	Week – 6	60 minutes	20
2	Quiz II (Objective NOT MCQ)	Week – 10	60 minutes	20
3	Quiz III (Practical Test)	Week – 15	60 minutes	10
4	Surprise tests + Submission of Assignments	--	--	10
CPA	Compensation Assessment (Written Test – for Quiz-I and II only)	Week -17	60 minutes	Maximum of 20
5	Descriptive Type Examination	02 nd Dec. – 13 th Dec. 2021	120 Minutes	40

COURSE EXIT SURVEY

- Feedback from the students during class committee meetings
- Anonymous feedback through questionnaire (Mid of the semester & End of the semester)
- End semester feedback on Course Outcomes

COURSE POLICY

MODE OF CORRESPONDENCE

1. All the students are advised to check their MS-TEAMS regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through MS-TEAMS only.
2. Queries (if required) to the course teacher shall only be emailed to eeu.raja@gmail.com

COMPENSATION ASSESSMENT POLICY

CPA will be offered only for the students who could not appear for Assessments 1 and 2.

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

B.8.0 (as per regulation) Attendance All courses shall have a common attendance policy. At least 75% attendance in each course is mandatory. A maximum of 10% shall be allowed under On Duty (OD) / Medical Grounds.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing 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.
- For more details refer https://www.nitt.edu/home/academics/rules/BTech_Regulations_2019.pdf


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

ADDITIONAL INFORMATION


The faculty is available for consultation at times as per the intimation given by the faculty. Queries may also be emailed to the Course Coordinator directly at eeu.raja@gmail.com

FOR APPROVAL

Course Faculty

 24/08/2022

CC-Chairperson

 29/08/22

HOD

