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

Semester-3

COURSE PLAN PART-I			
Name of the program and specialization	B.Tech. / Electrical and Electronics Engineering		
Course title	DC MACHINES AND TRANSFORMERS LABORATORY		
Course code	EELR11	No. of credits	02
Course code of pre-requisite subject(s)	NIL		
Session	July 2022	Section (If, applicable)	B
Name of faculty	MR. VIKAS KUMAR and MS. NIDHI CHANDRAKAR	Department	EEE
Email	407121011@nitt.edu 407121007@nitt.edu	Telephone no.	+919065391068/ +919111349840
Name of course coordinator(s) (If, applicable)	NA		
Email	NA	Telephone no.	NA
Course type	√ Core course	☐ Elective course	

Syllabus

List of experiments

A basic introduction about the equipment and machines is ought to be done in an introductory class

- Introduction to MATLAB and simulation of magnetic circuits
- Open circuit and short circuit test on single phase transformer
- Load test on single phase transformer
- Open circuit characteristics of DC shunt generator
- Load test on DC shunt generator
- Load test on DC compound generator
- Load test on DC shunt motor
- Load test on DC series motor
- Speed control of DC shunt motor

Course objective
To expose students to the performance characteristics and practical aspects of DC machines and transformers

COURSE OUTCOMES (CO)	
Course outcomes	**Aligned program outcomes (Po)**
1. Interpret the constructional details of the DC machines and Transformers and understand the significance of different connections and characteristics.	**2, 7, 9, 10, 12**
2. Estimate or test the performance of any DC machine (shunt, series, and compound) and single-phase transformer, by conducting suitable experiments and reporting the results.	**2, 7, 8, 9, 10, 12**
3. Experiment and analyze DC motors' various speed control and braking techniques.	**2, 7, 8, 9, 10, 12**
4. Develop simulation models and prototype modules given implementing any control technique upon de motors and single-phase transformers for various applications.	**2, 7, 5, 8, 9, 10, 12**

COURSE PLAN PART-II
COURSE OVERVIEW
An Electrical Machine is an electro-mechanical energy converter. It is a device that converts either mechanical energy to electrical energy - ***generator*** or electrical energy to mechanical energy - ***motor.*** An electrical machine is a dual machine; hence, each machine can be used as either a generator or a motor. Almost all practical electrical machines convert energy from one form to another through the action of a magnetic field. Electrical machines provide green energy production and hence insight into such machines, their design, and working principles become inevitable for an electrical engineer. Only machines using magnetic fields as the medium of energy conversions are considered in this course. The ***transformer*** is an electrical device that transforms AC electrical energy at one voltage level to another voltage level, without altering the frequency of

operation. Since transformers also operate on the principle of electromagnetic induction, like generators and motors, depending on the action of the magnetic field to accomplish the change in voltage level, they are usually studied together with electrical machines. Moreover, transformers play a major role in power transfer in large power systems. Hence transformers are also taught along with the electrical machines. These three types of electric devices are ubiquitous in modern daily life.

As an Electrical Engineer, it is essential to Know the operating characteristics and relevant performance parameters of above said electrical machines. In this laboratory course, the performance of various DC machines and Transformers is tested by conducting standard experiments. In this lab, students will get complete exposure to power level circuit connections, and various types of analogy measuring instruments.

COURSE TEACHING AND LEARNING ACTIVITIES			
S. NO.	**Week/Contact hour**	**List of experiments/Activities**	**Mode of delivery**
1	23rd and 26th August	Introduction to MATLAB and simulation of magnetic circuits	MATLAB coding
2	30th August and 2nd Sept.	OC and SC test on single phase transformer	Hands-on
3	6th and 9th September	Load test on single phase transformer	Hands-on
4	13th and 16th September	Open circuit characteristics of DC shunt generator	Hands-on
5	20th and 23rd September	Load test on DC shunt generator	Hands-on
6	27th and 30th September	Load test on DC compound generator	Hands-on
7	4th and 7th October	**First assessment**	Practical Test
8	11th and 14th October	Sumpner's test	Demonstration
9	18th and 21st October	Parallel operation of Transformers and any left-out topics	Demonstration

10	25th and 28th October	Load test on DC shunt motor	Hands-on
11	1st and 4th November	Load test on DC series motor	Hands-on
12	11th and 15th November	Speed control of DC shunt motor	Hands-on
13	18th and 22nd November	**Compensation assessment or Repeat Lab experiment**	Practical test/ Hands-on
14	25th and 29th November	Final record submission	----------
16	2nd and 6th December	**Final assessment**	Practical Test

COURSE ASSESSMENT METHODS (Shall range from 4 to 6)

S. No.	Mode of assessment	Week/Date	Duration	%Weightage
1	All regular experiments	----------	3 hrs/Week	50
2	First assessment	7th week	120 minutes	20
3	Final assessment	16th week	150 minutes	30

COURSE EXIT SURVEY (Mention how the feedback about the course shall be assessed)

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

COURSE POLICY

MODE OF CORRESPONDENCE

1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through their webmail only.
2. Queries (if required) to the course teacher shall only be emailed to 407121011@nitt.edu

COMPENSATION ASSESSMENT POLICY

- Compensation Lab session will be given for the students who are absent for the regular session with prior permission.

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

- At least 75% attendance in each course is mandatory.
- Students with less than 75% attendance shall be prevented from writing the final assessment and be awarded a 'V' grade.

ACADEMIC DISHONESTY AND PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, or copying from others during an assessment will be treated as punishable dishonesty.
- Zero marks are to be awarded to 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, 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 apply to all the programs.

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 407121011@nitt.edu

FOR APPROVAL

Vikas kumar 23/08/22

MR. VIKAS KUMAR
Course Faculty-1

23/08/22

MS. NIDHI CHANDRAKAR
Course Faculty-2

C Nagamani

DR. C. NAGAMANI
CC-Chairperson

DR. V. SANKARNARAYANAN
HOD