

**COURSE STRUCTURE & SYLLABUS OF
BACHELOR OF TECHNOLOGY (B.TECH)**

In

ELECTRICAL

Course Structure

Fourth Year

VIII Semester

Paper Code	Name of the Subject
BEE6	Machine Drives
BEE7	Design & Estimation Of Electrical System
BEE8	Electrical Machine design
BEE9	Project
BEE6P	Machine drives

Syllabus

BEE 6 MACHINE DRIVES

- 1. CHARACTERISTICS OF THE ELECTRIC MOTORS**
Introduction, Characteristics Of Dc Motors, Characteristic Of Three-Phase Induction Motor , Variation Of Applied Voltage, Pole Change Motors, Slip Power Recovery Schemes, Characteristics Of Synchronous Motors
- 2. DYNAMICS OF ELECTRIC DRIVES**
Introduction, Classification Of Electric Drives, Basic Elements Of An Electric Drive, Dynamic Conditions Of A Drive System, Stability Considerations Of Electrical Drives
- 3. CONVERTERS FOR FEEDING ELECTRIC MOTORS**
A General Survey Of Converters For Feeding Electric Motors, Phase Controlled Line Commutated Converters
- 4. CONTROL OF ELECTRIC MOTOR**
Induction motor drives, synchronous motor drives, dc drives.
- 5. CONTROL TECHNIQUES**
Introduction, block diagram representation of drive systems, signal flow graph representation of the systems, transfer functions, transient response of closed loop drive systems, frequency response approach

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BEE 7 DESIGN AND ESTIMATION OF ELECTRICAL SYSTEMS

1. ELEMENTS OF ESTIMATING:

.Introduction ,Purpose of Estimating and Costing:, Qualities of a good Estimator, Essential Elements of Estimating and Costing, Tender, Guidelines for Inviting Tenders, Quotation, Other Important Factors of Estimating and Costing, Brief Questions with Answers.

2. CONVENTIONAL SYMBOLS:

Differential Types of Symbols.

3. WIRES, WIRE JOINTS, TERMINATION AND WIRING TOOLS:

Introduction, Wire and Cable, Choice of Conductor, Conductor Materials, Insulating Materials ,Types of Wires used for Internal Wiring, Wire Splicing and Termination.

4. TYPES OF HOUSE WIRING:

Cleat Wiring, Wooden Casing and Capping Wiring, PVC Casing and Capping Wiring, Tough Rubber Sheathed Wiring or Batton Wiring, Lead Sheathed or Metal Sheathed Wiring, Conduit Wiring System, Conduit Accessories and Fitting, Advantages and Disadvantages of Conduit Wiring Systems.

5. WIRING MATERIALS:

Domestic Wiring Accessories , Miniature Circuit Breaker, Residual Current Circuit Breaker or Earth Leakage Circuit Breaker, Components used for Protection Against Earth Leakage Current, Characteristics, Working and Construction of ELCB or RCCB; Load Change, Over Switches

6. TESTING OF INSTALLATION:

General , Insulation Resistance Test between Installation and Earth, Testing of Insulation Resistance Test between Conductors, Testing of Polarity of Single Pole Switches, Earth Continuity, How to Measure Earth Resistance , Megger Earth Tester, Voltmeter Method of Testing Earth.

7. PROTECTION AGAINST OVERLOAD, SHORT CIRCUIT AND EARTH FAULTS.

General , Main Features of Good Protective Devices, Protective Relays, Essential Fundamental Elements of Relay, Description of Relays, Buchholz Relay Protection, Electromagnetic Attraction Type Relays, Induction Type Over Current Relay, Induction Type Reverse Power Relay, Moulded Case Circuit Breakers.

8. EARTHING, ELECTRIC SHOCK , ELECTRIC FIRE, FIRE FIGHTING EQUIPEMENT:

Earthing, Purpose of Earthing, IS Specification Regarding Earthing of Electrical Installation, Definitions, Different Methods of Earthing , Brief Question- Answers, Electric Shock Factors on which Intensity of Electric Shock Depends, Cure of Electric Shock, Brief Questions Answers, Electrical Fire-fighting, Fire fighting Teams.

9. DOMESTIC ELECTRICAL INSTALLATION AND ESTIMATES:

General , Definitions, Drawing , Definition and Measurements of Points and Wiring, Electric Substation and Wiring Installation, Electric Installation in Building , Control at Commencement of Supply, Types of SB's Capacity of Circuit Internal Wiring Estimates, Sequence to be followed in Carrying out the Estimates, Definition and Positioning of Equipment , Arrangement of Apparatus, Locations of Various Outlets in House Wiring, Selection of Wires. Sub-circuits , Selection Rating and Installation of Necessity Equipment on the Main Switch Board.

10. MOTOR (CONTACTOR)CONTROL CIRCUITS:

General, Definitions of Equipments, Contactor Control Circuit Components, Contactor Control Circuits and Diagrams, Design Guidelines , Motor Control Circuits, Sequence Starting of Motors Manually/ Automatically, Automatic Sequence Control of Two and Three Motors with Time Delay, Motor

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Operated from Two Alternative Sources of Supplies, Starting of Two speed Squirrel Cage Induction Motor, Star Delta Starters.

11. THREE PHASE FOUR WIRE DISTRIBUTION SYSTEM:

General, Transmission Systems from Sub-station, Comparison between D.C. and A.C. Supply System, Components of Distribution Overhead Line, Determination of Size of Conductor for Overhead Transmission Line. Insulators, Various Types of Insulators, Methods of Tying, Conductor with Insulator, Lightning Arrester, Earthing of Transmission, Stay Tightners,

12. UNDERGROUND CABLES, INSTALLATION, ESTIMATES AND STREET LIGHTING:

General, Planning the Route for Cable Laying, Laying of Cable, Precautions of Excavation of Trenches, Procedures for Drawing in Cables, Classification of Cables, Underground Cables for Street Lighting, Laying of Cables, Street Light Poles.

BEE8 – Electrical Machine Design

Basic principles of magnetic circuit, Magnetic circuit calculation, Iron loss, magnetic leakage calculations, magnetic current, unbalanced magnetic pull, field form, armature winding, Integrated approach for windings, production of emf in windings, mmf distribution of armature winding, eddy current losses in conductors, transformers, design, operating characteristics, design of small single phase transformers, general concept and constraints of design of rotating machines, d.c machine design, armature reaction armature design, design of field system, commutation, design of interpoles, design of interpoles and brushes, losses and efficiency, three phase induction motor, design, rotor design, design of squirrel cage rotor, operating characteristics, single phase induction motor, design, operating characteristics

BEE9: Project Guideline

Thinking up a Project

You are expected to come up with your own idea for a project. A wide range of topics is acceptable so long as there is substantial computing content and project is predominantly of a practical, problem-solving nature. You might take up an interest which you already have in your stream of engineering. You may do your project in any reputed organization or a department. Individually or a group of maximum 4 students can take up a project. The project is a vehicle for you to demonstrate the required level of competence in your chosen field of Bachelors.

Start thinking about your project right in the beginning. If you want to do the project in industrial environment start your correspondence fairly early to find an organization, which is ready to accept you. You must submit an outline of your project (two or three pages) to your guide within one month of start of the project work. This must include the Title, Objective, Methodology (main steps to carry out a project), expected output and organization where you intend to carry out the project.

Arranging a Guide

When you have an idea of your project, even a tentative one, approach a suitable person who has interest and expertise in that area. The Guide may be a person with M.E. / M.Tech or a B.E./ B.Tech having a working experience of 3 years in relevant field.

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Working with the Guide

The Guide's role is to provide support and encouragement to direct the student's attention to relevant literature, to provide technical assistance occasionally, to read and comment on the draft report and to give guidance on the standard and amount of work required. The Guide is not responsible to teach any new skills and language required for project work or for arranging any literature or equipment. . Rest you can work out your own arrangement. The students, who are content to carry out their work largely without supervision, should keep their Guide in touch with what they are doing. A student should not remain silent for months and then appear with a complete project work unknown to supervisor. In such circumstances, the Guide cannot be counted on to give an automatic seal of his approval. If a project produces a piece of software, the Guide would normally expect to see a demonstration of the software in action.

The main purpose of the report is to explain what you did in your project. The reader should be able to see clearly what you set out to do and what you achieved. It should describe the problem addresses and explain why you tackled it in the way you did. It should include your own assessment of how successful the project was.

Resist temptation to include pages of padding. If the project consists of developing an application in area with which a computer scientist would not be familiar – such as chemical testing, stock & shares – it might be necessary to include some explanatory company/ organization profile for whom you have done the work must not appear in chapters and must go to appendix part.

The work that is presented for examiners should be your own. The presentation of another person's work, design or program as though they are your own is a serious examination offence. Direct quotation from the work of others (published or unpublished) must always be clearly identified as such by being placed in quotation marks, it is essential that reader should be able to see where the other work ends and your begins.

Sometimes a project containing good work is marred by a report, which is turgid, obscure and simply ungrammatical. In such cases, it is very difficult to find out the work done during the project. An examiner cannot be kind enough to look properly on a project that is almost unreadable.

Some important points for carrying out a project

The organizations or companies offer you a placement for project work out of good will or to get some useful work done. Usually the companies do not provide you everything required by you. You must settle this right in the beginning of the project with the business that what will you get from them and what you have to arrange yourself.

Sometimes a complication arises due to the fact that some aspect of your project work is considered confidential by the company. If this is so, it is your responsibility to get whatever clearance is necessary from the organization right in the beginning as essential parts like system analysis and design, flow charts etc. can not be missing from a project report.

Make sure you allow enough time for writing report. It is strongly recommended that do some writing work as you carry out the project rather than leaving write up until the end. You must allow at least a month to finally write the report. There has to be enough time for the supervisor to read and comment on it and for student to make changes (sometimes extensive) on the basis of the comments. You may have to prepare two or three drafts before the final submission. Remember that it is mainly the project reports that get examined. An external supervisor receives a pile of project reports written by people who he does not know. If a project produced some software he even may not get time to see it running. In most cases he forms his judgment purely on the basis of the report. Please make your report as readable as possible content wise as well as presentation wise.

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- 1. **Introduction:** This must contain background, any previous work done in the area of your project, your objective and other relevant material that may be helpful to further explain your project work.
- 2. **The existing system:** The study of the present system; problems in existing system.
- 3. **System design:** The proposed system; Any specific problem encountered at how you handled them.
- 4. **Implementation of the system:** Implementation issues and their justification.
- 5. **Conclusions:** Any shortcoming; your assessment of your work; comparison of your work with similar works; salient features of your work any feature modification. Real time applications of your project work.

References must be given at the end following any standard way of giving references.
For example:
Langdrof, ‘Theory of Alternating Current Machinery” Tata McGraw Hill, July 2003.
Finally, your project work is your brainchild and nobody knows about it more than you. Be confident to explain your work at the time of viva and be honest to accept any short falls.

The Project Report Details

The report should be prepared with the Word Processing software. They should be printed on A4 size (Executive Bond) paper. A margin of 1.5 inches must be allowed on left hand side for binding. The pages should be numbered. The report should be typed in the 12-font size with vertical spacing of 1.5

A report should be hard bound (light green cover with golden print on the cover). The title of the project should be clearly visible on the cover.

The cover page should be as figures below. The first page should be title page containing the title, the candidates name, Enrolment Number, and Name of University. Second page is a certificate from the supervisor. The 3rd page is for the acknowledgement. Fourth page gives the contents of the project report. Fifth page should be an abstract of the project followed by the chapters. You must ensure that all pages are legible. Where the project has produced software for a personal computer, you should include a CD inside the back cover of the report, along with instructions in the report how to run it.

Cover Page
Project Title
A Project Report

Submitted in partial fulfillment
of the degree of Bachelor of
Technology

Supervisor’s Name Student’s Name

LOGO

Sai Nath University
Ranchi, Jharkhand.
(Year)

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Certificate by Supervisor

Acknowledgment

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