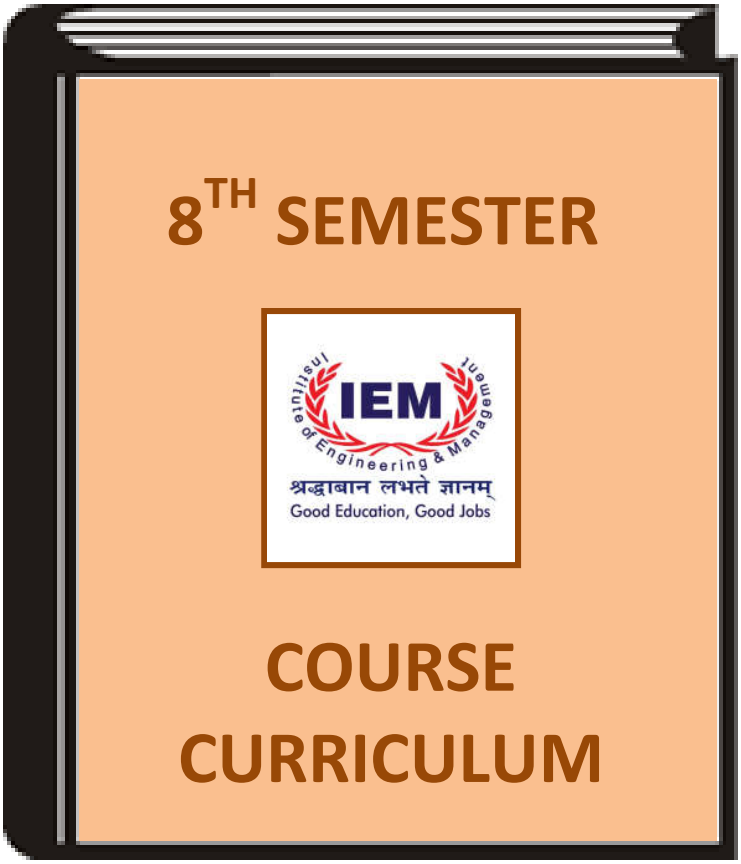
DEPARTMENT OF ELECTRICAL ENGINEERING



INSTITUTE OF ENGINEERING & MANAGEMENT

Course: Organizational Behaviour HU 801A

PROGRAMME:**ELECTRICAL ENGINEERING**	DEGREE:**B. TECH**
COURSE :**ORGANIZATIONAL BEHAVIOUR**	SEMESTER: **8** CREDITS: **2**
COURSE CODE : **HU 801A**	COURSE TYPE: **THEORY**
COURSE AREA/DOMAIN: **ORGANIZATIONAL & GROUP BEHAVIOUR,ORGANIZATIONAL POLITICS, PERSONALITY, ATTITUDES, LEADERSHIP & MOTIVATION**	CONTACT HOURS: **2 (WEEKLY)**
CORRESPONDING LAB COURSE CODE (IFANY): **NA**	LABCOURSE NAME : **NA**

Course pre-requisites

CODE	COURSE NAME	DESCRIPTION	SEM.
HU101	**English Language & Tech. Communication**	Basic command of English to talk about day- to-day events and experiences of life. Communication Skills.	**1**
HU401	**Values And Ethics In Profession**	Effects of Technological Growth, Ethics of Profession, Profession and Human Value.	**4**

Course Objectives

1. To improve the student's Personality and Attitude.
2. To improve the skill of theories of Motivation
3. To improve the skill of Group Behaviour

Course Outcomes

At the end of the course, the students will be able to:

CO1: Students would be able to build up Organizational Behaviour, Personality and Attitude.
CO2: Students would be able to develop Group Behaviour & Communication skill.
CO3: An ability to handle the Organizational Politics.
CO4: An ability to improve Organizational Design structure.

ProgrammeOutcomes addressed in this course

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO1					√		√	√	√
CO2					√	√		√	√
CO3					√		√	√	√
CO4					√			√	√

Syllabus

UNIT	DETAILS	HOURS
I	**Organizational Behaviour:** Definition, Importance, Historical Background, Fundamental Concepts, Challenges and Opportunities for OB.	2
II	**Personality and Attitudes:** Meaning of personality, Personality determinants and traits, Development of Personality, Types of Attitudes, Job Satisfaction.	2
III	**Perception:** Definition, Nature and Importance, Factors influencing perceptions, Perceptual Selectivity, Link between Perception and Decision making.	2
IV	**Motivation:** Definition, Theories of motivation,- Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory.	4
V	**Group Behaviour:** Characteristics of Groups, Types of groups, Stages of Group Development, Group Decision Making.	2
VI	**Communication:** Process, Direction of Communication, Barriers to Effective Communication	2
VII	**Leadership:** Definition, Importance, Theories of Leadership Styles.	2
VIII	**Organizational Politics:** Definition, Factors contributing to Political Behaviour.	2
IX	**Conflict Management:** Traditional vis-à-vis Modern view of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation- Bargaining Strategies, Negotiation Process.	2
X	**Organizational Design:** Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture.	4

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	Concept of overcoming attitudinal problem & ego conflict in an organization.	Remedial Class	8,9

Topics beyond syllabus/advanced topics

S.NO.	DESCRIPTION	HOURS
1	Newspaper reading-Current Affairs, Case-Study, Inspirational quotes, Motivational speech, etc.	3

Web Source References

S.NO.	URL
1	http://www.wbut.ac.in/syllabus/EE_Final_Upto_4th_Year%20Syllabus_14.03.14.pdf

Books References:

1. Shukla, Madhukar: Understanding Organizations- Organizational Theory & Practice in India. PHI
2. Robbins, S.P. & Judge, T.A.: Organizational Behaviour, Pearson Education, 15th Edn.
3. Luthans, Fred: Organizational Behavior, McGraw Hill, 12th Edn.
4. Fincham, R. & Rhodes, P.: Principles of Organizational Behaviour, OUP, 4th Edn.
5. Hersey, P., Blanchard, K.H., Johnson, D.E.- Management of Organizational Behavior Leading Human Resources, PHI, 10th Edn.

Delivery/Instructional Methodologies

S.NO.	DESCRIPTION
1	Chalk and Talk
2	Power Point Presentation
3	Study Materials

Assessment Methodologies

S.NO.	DESCRIPTION	TYPE
1	Student Assignment	Direct
2	Tests	Direct
3	University Examination	Direct
4	Student Feedback	Indirect

Course Plan

S. NO.	Day	Module	Topic
1	Day 1		**Organizational Behaviour:** Definition, Importance, Historical Background.
2	Day 2		**Organizational Behaviour:** Fundamental Concepts, Challenges & Opportunities for OB.
3	Day 3		**Personality and Attitudes:** Meaning of personality, Personality determinants and traits, Development of Personality.
4	Day 4		**Personality and Attitudes:** Types of Attitudes, Job Satisfaction.
5	Day 5		**Perception:** Definition, Nature and Importance, Factors influencing perceptions.
6	Day 6		**Perception:** Perceptual Selectivity, Link between Perception and Decision making.
7	Day 7		**Motivation:** Definition, Theories of motivation- Maslow's Hierarchy of Needs Theory.
8	Day 8		**Motivation:** Theories of motivation- McGregor's Theory X & Y,
9	Day 9		**Motivation:** Theories of motivation- Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory.
10	Day 10		**Motivation:** Theories of motivation- McClelland's Theory of Needs, Vroom's Expectancy Theory.
11	Day 11		**Group Behaviour:** Characteristics of Groups, Types of groups.
12	Day 12		**Group Behaviour:** Stages of Group Development, Group Decision Making.
13	Day 13		**Communication:** Process, Direction of Communication.
14	Day 14		**Communication:** Barriers to Effective Communication
15	Day 15		**Leadership:** Definition, Importance.
16	Day 16		**Leadership:** Theories of Leadership Styles.
17	Day 17		**Organizational Politics:** Definition.
18	Day 18		**Organizational Politics:** Factors contributing to Political Behaviour.
19	Day 19		**Conflict Management:** Traditional vis-à-vis Modern view of Conflict, Functional and Dysfunctional Conflict.
20	Day 20		**Conflict Management:** Conflict Process, Negotiation- Bargaining Strategies, Negotiation Process.
21	Day 21		**Organizational Design:** Various Organizational Structures.
22	Day 22		**Organizational Design:** Their Effects on Human Behaviour.
23	Day 23		**Organizational Design:** Concepts of Organizational Climate.
24	Day 24		**Organizational Design:** Organizational Culture.

Course: EE801A - HVDC transmission

PROGRAMME:**ELECTRICAL ENGINEERING**	DEGREE:**B. TECH**
COURSE: **HVDC transmission**	SEMESTER: **8** CREDITS: **3**
COURSE CODE: **EE-801A**	COURSE TYPE: **Theory**
COURSE AREA/DOMAIN: **Idea on high voltage DC transmission, reliability strategy, converters operation, harmonic suppression, power quality upgrading, MTDC etc.**	CONTACT HOURS: 3 **(weekly)**
CORRESPONDING LAB COURSE CODE (IFANY):**NA**	LABCOURSE NAME: **NA**

Course pre-requisites

CODE	COURSE NAME	DESCRIPTION	SEM.
EE502, EE602	**Power system I, II**	Transmission protocols, faults analysis, harmonics, power quality improvement	**5 & 6**
EE603	**Power electronics**	Power converters, harmonics suppression topologies	**6**

Course Objectives

1. Produce Electrical Engineering graduates who have strong foundation in power electronics devices or engineering knowledge in solid state devices to enhance them with modern high end power converters technology for technical competence in high voltage DC transmission engineering. (PEO1)

Course Outcomes

1. Students would be able to know about significance of HVDC transmission now-a-days.
2. Students would be able to understand the application of bridge converters in HVDC transmission.
3. Students would be able to diagnose adverse condition during faults, production and filtering of harmonics.

Programme Outcomes addressed in this course

1. An ability to apply knowledge of mathematics, science, and engineering. (PO. 1)
2. An ability to identify, formulate and solve engineering problem. (PO. 2)
3. An ability to design and conducts experiments as well as interpret data. (PO. 3)
4. An ability to design a system or process to meet the desired result within technical and socio- economic constraints. (PO. 4)

PO / LO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
LO1	√	√							√
LO2	√		√	√					
LO3		√	√						√

Syllabus

UNIT	DETAILS	HOURS
I	**Introduction:** Introduction of DC power transmission technology, comparison of AC and DC transmission, limitation of HVDC transmission, reliability of HVDC systems, application of DC transmission, description of DC transmission system, planning for HVDC transmission, modern trends in DC transmission. **Analysis of HDVC converters:** Choice of converter configuration, simplified analysis of Graetz circuit, converter bridge characteristics, Characteristics of a twelve pulse converter, detailed analysis of converters. **Control of HVDC converter and systems:** Necessity of control of a DC link, rectifier control, compounding of rectifiers, power reversal of DC link, voltage dependent current order limit(VDCOL) characteristics of the converter, inverter extinction angle control, pulse phase control, starting and stopping of DC link, constant power control, control scheme of HVDC converters.	12
II	**Harmonics and filters:** Generation of harmonics by converters, characteristics of harmonics on DC side, characteristics of current harmonics, characteristic variation of harmonic currents with variation of firing angle and overlap angle, effect of control mode on harmonics, non-characteristic harmonic. Harmonic model and equivalent circuit, use of filter, filter configuration, design of band-pass and high pass filter, protection of filters, DC filters, power line communication and RI noise, filters with voltage source converter HDVC schemes.	10
III	**Fault and protection schemes in HVDC systems:** Nature and types of faults, faults on AC side of the converter stations, converter faults, fault on DC side of the systems, protection against over currents and over voltages, protection of filter units. **Multiterminal HVDC systems:** Types of multiterminal (MTDC) systems, parallel operation aspect of MTDC. Control of power in MTDC. Multilevel DC systems. Power upgrading and conversion of AC lines into DC lines, Parallel AC/DC systems, FACTS and FACTS converters.	8

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	VSC based HVDC installation	Extra Class	9

Topics beyond syllabus/advanced topics

S.NO.	DESCRIPTION	HOURS
1	VSC-HVDC network for bulk power transmission	2

Web Source References

S.NO.	URL
1	http://ieeexplore.ieee.org/document/4237713/

Books References:

1. HVDC Transmission, S. Kamakshaiah & V. Kamaraju, Tata McGraw hill education.
2. High Voltage Direct Current Transmission, J. Arrillaga, Peter Pregrinu.
3. High Voltage Direct Current Power Transmission, Colin Adamson and N.G.Hingorani, Garraway Limited, London

Delivery/Instructional Methodologies

S.NO.	DESCRIPTION
1	Chalk and Talk
2	Power Point Presentation, Tutorial Video

Assessment Methodologies

S.NO.	DESCRIPTION	TYPE
1	Student Assignment	Direct
2	Tests	Direct
3	University Examination	Direct
4	Student Feedback	Indirect

Course Plan

S. NO.	Day	Module	Topic
1	Day 1	I	Introduction of DC power transmission technology, comparison of AC and DC transmission, limitation of HVDC transmission
2	Day 2		Reliability of HVDC systems, application of DC transmission, description of DC transmission system, planning for HVDC transmission, modern trends in DC transmission.
3	Day 3		Choice of converter configuration, simplified analysis of Graetz circuit
4	Day 4		Converter bridge characteristics, Characteristics of a twelve pulse converter
5	Day 5		Detailed analysis of different converters.

6	Day 6		Necessity of control of a DC link, rectifier control, compounding of rectifiers.
7	Day 7		Power reversal of DC link
8	Day 8		Voltage dependent current order limit(VDCOL)
9	Day 9		Characteristics of the converter
10	Day 10		Inverter extinction angle control, pulse phase control
11	Day 11		DC link, starting and stopping of DC link
12	Day 12		Constant power control, control scheme of HVDC converters
13	Day 13	II	Generation of harmonics by converters, characteristics of harmonics on DC side
14	Day 14		Characteristics of current harmonics
15	Day 15		Characteristic variation of harmonic currents with variation of firing angle and overlap angle, effect of control mode on harmonics, non-characteristic harmonic.
16	Day 16		Characteristic variation of harmonic currents with variation of firing angle and overlap angle, effect of control mode on harmonics, noncharacteristic harmonic(cont.)
17	Day 17		Harmonic model and equivalent circuit,
18	Day 18		Use of filter, filter configuration, design of band-pass and high pass filter, protection of filters, DC filters
19	Day 19		Power line communication and RI noise
20	Day 20		Filters with voltage source converter HDVC schemes.
21	Day 21	III	Nature and types of faults,
22	Day 22		converter faults, faults on AC side of the converter stations,
23	Day 23		Fault on DC side of the systems
24	Day 24		Protection against over currents and over voltages, protection of filter units.
25	Day 25		Types of multi-terminal (MTDC) systems
26	Day 26		parallel operation aspect of MTDC
27	Day 27		Control of power in MTDC. Multilevel DC systems
28	Day 28		Power upgrading and conversion of AC lines into DC lines
29	Day 29		Parallel AC/DC systems
30	Day 30		FACTS and FACTS converters

Course: EE-802B – SENSORS AND TRANSDUCERS

PROGRAMME:**ELECTRICAL ENGINEERING**	DEGREE:**B. TECH**
COURSE: **SENSORS AND TRANSDUCERS**	SEMESTER: **8** CREDITS: **3**
COURSECODE: **EE-802B**	COURSE TYPE: **Theory**
COURSE AREA/DOMAIN: **Basic idea about Sensors and Transducers, operation and Applications**	CONTACTHOURS: 3 **(weekly)**
CORRESPONDINGLABCOURSE CODE (IFANY):**NA**	LABCOURSE NAME:**NA**

Course pre-requisites

CODE	COURSE NAME	DESCRIPTION	SEM.
EE-402	**Electrical & Electronic measurement**	Measurement of different electrical parameter	**4**

Course Objectives

2. To gain knowledge about the measuring instruments and the methods of measurementand the use of different transducers (PEO1)

Course Outcomes

1. To get the basic idea of measurements and the errors associated with measurement.
2. To differentiate between the types of transducers available
3. To gain information about the function of various measuring instruments and using them

Programme Outcomes addressed in this course

1. An ability to apply knowledge of different sensors and transducers. (PO 1.)
2. An ability to work on multidisciplinary projects (PO 4.)
3. The broad education necessary to understand the impact of engineering solutions in a global,Economic, environmental, and context (PO 8.)
4. A knowledge of contemporary issues (PO. 9)

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO1	√		√	√					
CO2	√	√		√				√	
CO3		√	√						√

Syllabus

UNIT	DETAILS	HOURS
I	**Mechanical and Electromechanical sensor:** Definition, principle of sensing & transduction, classification. Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity. Strain gauge: Theory, type, materials, design consideration, sensitivity, gauge factor, variation with temperature, adhesive, rosettes. Inductive sensor: common types- Reluctance change type, Mutual inductance change type,transformer action type, Magnetostrictive type, brief discussion with respect to material,construction and input output variable, Ferromagnetic plunger type, short analysis. LVDT: Construction, material, output input relationship, I/O curve, discussion. Proximity sensor	12
II	**Capacitive sensors:** Variable distance-parallel plate type, variable area- parallel plate, serrated plate/teeth type and cylindrical type, variable dielectric constant type, calculation of sensitivity. Stretched diaphragm type: microphone, response characteristics. Piezoelectric element: piezoelectric effect, charge and voltage co-efficient,crystal model, materials, natural & synthetic type, their comparison, force & stress sensing, ultrasonic sensors.	8
III	**Thermal sensors:** Material expansion type: solid, liquid, gas &vapor Resistance change type: RTD materials, tip sensitive & stem sensitive type, Thermister, material, shape, ranges and accuracy specification. Thermo emf sensor: types, thermoelectric power, general consideration, Junction semiconductor type IC and PTAT type. Radiation sensors: types, characteristics and comparison. Pyroelectric type.	11
IV	**Magnetic sensors:** Sensor based on Villari effect for assessment of force, torque, proximity, Wiedemann effect for yoke coil sensors, Thomson effect, Hall effect, and Hall drive, performance characteristics. Radiation sensors: LDR, Photovoltaic cells, photodiodes, photo emissive cell types, materials, construction, response. Geiger counters, Scintillation detectors, Introduction to smart sensors	9

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	Design concept of signal conditioning circuit	Extra Class	a.

Topics beyond syllabus/advanced topics

S.NO.	DESCRIPTION	HOURS
1	Introduction to different sensors and transducer of Flow measurement	2

Web Source References

S.NO.	URL
1	http://www.pacontrol.com/

Books References:

1. Sensor & transducers, D. Patranabis, 2nd edition, PHI
2. Instrument transducers, H.K.P. Neubert, Oxford University press.

Delivery/Instructional Methodologies

S.NO.	DESCRIPTION
1	Chalk and Talk
2	Power Point Presentation

Assessment Methodologies

S.NO.	DESCRIPTION	TYPE
1	Student Assignment	Direct
2	Tests	Direct
3	University Examination	Direct
4	Student Feedback	Indirect

Course Plan

S. NO.	Day	Module	Topic
1	Day 1	Mechanical And electromechanical sensor	General introduction to different type of sensors and transducers
2	Day 2		Definition, principle of sensing & transduction, classification.
3	Day 3		Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity.
4	Day 4		Strain gauge: Theory, type, materials, design consideration, sensitivity
5	Day 5		Gauge factor,variation with temperature, adhesive, rosettes
6	Day 6		Numerical problems on Strain Gauge
7	Day 7		Inductive sensor: common types- Reluctance change type, Mutual inductance change type,transformer action type.
8	Day 8		LVDT and its application
9	Day 9		Magnetostrictive type, brief discussion with respect to material, construction and input output variable, Ferromagnetic plunger type, short analysis.
10	Day 10		LVDT: Construction, material, output input relationship, I/O curve, discussion.
11	Day 11		Proximity sensor
12	Day 12		Different types of industrial application of Proximity sensor
13	Day 13	**Capacitive sensors**	General introduction to different type of sensors and transducers
14	Day14		Definition, principle of sensing & transduction, classification.
15	Day 15		Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity.
16	Day 16		Strain gauge: Theory, type, materials, design consideration, sensitivity
17	Day 17		Gauge factor,variation with temperature, adhesive, rosettes
18	Day 18		Numerical problems on Strain Gauge
19	Day 19		Inductive sensor: common types- Reluctance change type, Mutual inductance change type,transformer action type.
20	Day 20		LVDT and its application
21	Day 21	**Thermal sensors**	Material expansion type: solid, liquid
22	Day22		Material expansion type: gas & vapor
23	Day 23		Resistance change type: RTD materials, tip sensitive & stem sensitive type
24	Day 24		Thermistermaterial, shape, ranges and accuracy specification.
25	Day 25		Thermo emf sensor: types, thermoelectric power, general consideration
26	Day 26		Junction semiconductor type IC and PTAT type.
27	Day 27		Radiation sensors: types, characteristics and comparison
28	Day 28		Pyroelectric type
29	Day 29	**Magnetic sensors:**	Sensor based on Villari effect for assessment of force
30	Day 30		Wiedemann effect for yoke coil sensors

31	Day 31		Thomson effect and its application
32	Day 32		Hall effect, and Hall driveperformance characteristics
33	Day 33		Radiation sensors: LDR, Photovoltaic cells, photodiodes
34	Day 34		photo emissive cell types, materials, construction, response.
35	Day 35		Geiger counters
36	Day 36		Scintillation detectors
37	Day 37		Introduction to smart sensors
38	Day 38		Introduction to flow sensors
39	Day 39		Numerical from sensors and transducers
40	Day 40		University question papers discussion

Course: EE 882 Electrical System Design Laboratory - II

PROGRAMME: **ELECTRICAL ENGINEERING.**	DEGREE:**B. TECH.**
COURSE: **Electrical System Design Laboratory - II**	SEMESTER: 8 CREDITS: **4**
COURSECODE: **EE 882**	COURSE TYPE: **Practical**
COURSE AREA/DOMAIN: **Design of electrical machines, power system etc.**	CONTACT HOURS: **6 (weekly)**
CORRESPONDING THEORY COURSE CODE (IFANY): **NA**	THEORY COURSE NAME: **NA**

Course pre-requisites

CODE	COURSE NAME	DESCRIPTION
EE-501	Electric Machine-II	Principle and operations of electrical machines
EE-703	Power system-III	Knowledge of substation

Laboratory Educational Objectives (LEOs) :

Conceptual Understanding: Develop students' understanding through laboratory activities to solve problems related to key concepts taught in the classroom.

Models: Identify the strength and limitations of theoretical models and establish a relationship between measured data and underlying physical principles.

Debugging Skills: Develop debugging capability in order to propose and apply effective engineering solutions.

Laboratory Outcomes (Los):

After completing this course, students will be able:

1. To identify the basic equations for modeling of the electrical systems.
2. Design and build a model to meet desired specifications.

Programme Outcomes addressed in this course

PO / LO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
LO1	√	√			√				
LO2	√		√	√	√				√

LIST OF EXPERIMENTS:

Group-A	• Designing a heating element with specified wattage, voltage and ambient temperature. • Designing an air core grounding reactor with specified operating voltage, nominal current and fault current.
Group-B	• Designing the power distribution system for a small township. • Designing a double circuit transmission line for a given voltage level and power (MVA) transfer. • Wiring and installation design of a multistoried residential building (G+4,not less than 16 dwelling flats with a lift and common pump) • Designing of a substation
Group-C	• Designing an ONAN distribution transformer. • Designing a three phase squirrel cage induction motor. • Designing a three phase wound rotor induction motor. • Designing a split phase squirrel cage induction motor for a ceiling fan or a domestic pump. • Designing a permanent magnet fractional hp servo motor.
Group-D	• Design the control circuit of a Lift mechanism • Design a controller for speed control of DC machine. • Design a controller for speed control of AC machine.

Delivery/Instructional Methodologies

S.NO.	DESCRIPTION
1	Chalk and Talk
2	Power Point Presentation

Assessment Methodologies

S.NO.	DESCRIPTION	TYPE
1	Student Assignment	Direct
2	Tests	Direct
3	University Examination	Direct
4	Student Feedback	Indirect

Course Plan: EE 882

Days	Experiment Performed
1	Principle of the power distribution system for a small township.
2	Development of working equations for power distribution system for a small township
3	Designing the power distribution system for a small township
4	Principle of a double circuit transmission line
5	Working formula for a double circuit transmission line for a given voltage level and power (MVA) transfer.
6	Designing a double circuit transmission line for a given voltage level and power (MVA) transfer.
7	Wiring and installation design of a multistoried residential building
8	Assignment on wiring and installation design of a multistoried residential building (G+4, with a lift and common pump)
9	Principle of a substation model
10	Designing of a substation
11	Principle of permanent magnet fractional hp servo motor design
12	Designing a permanent magnet fractional hp servo motor.
13	Design the control circuit of a Lift mechanism
14	Design a controller for speed control of DC machine.
15	Design a controller for speed control of AC machine.