

- (A) **COURSE TITLE & CODE** : **PERSONALITY DEVELOPMENT, G – 305**  
 (B) **LEVEL** : **THREE**  
 (C) **BRANCH/ DISCIPLINE** : **General**  
 (D) **RATIONALE** :

In people centered occupations, the human element – the smiling face, the thoughtful words, the warm voice and welcoming posture – is the added value. A pleasing personality, well-groomed outlook and a pleasant smile is appreciated by every one.

The students after studying this subject will be able to manage customer problems with understanding and sensitivity; communicate effectively; develop positive working relationship with employees demonstrate etc.

**(E) TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	G- 305	Personality Development		3	2	-	5	75	25	-	-	100

**(F) DETAILED COURSE CONTENTS**

**CHAPTER-1.0 FACTORS INFLUENCING PERSONALITY DEVELOPMENT**

- Internal factors
  - Knowledge
  - Values
  - Skills
  - Self confidence
- External factors
  - Communication
  - Dress
  - Personality traits

**CHAPTER-2.0 SELF DEVELOPMENT**

- Stages of learning
  - Information
  - Knowledge
  - Skills
  - Insight
  - Foresight

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- Wisdom
  - SWOT Analysis
    - S & W – Internal
    - O & T – External
  - Meditation
  - Yoga
  - Exercise

### **CHAPTER 3.0 NON-VERBAL LANGUAGE**

- Touch
- Proximity & spatial behaviour
- Body movement & gestures
- Eye contact
- Appearance
- Voice
- Facial expression
- Silence

### **CHAPTER-4.0 MOTIVATION**

- Commitment & willingness
  - Towards job
  - Towards higher authorities
  - Towards Tourism industry

### **CHAPTER-5.0 SOCIAL ETIQUETTES**

- Etiquette & mannerisms
- Politeness & courtesy

### **CHAPTER-6.0 SELF IMPROVEMENT**

- Grooming
- Dress code
- Posture
- Make-up
- Saree draping
- Jewellery
- Etiquette at the table

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**(G) SPECIFICATION TABLE SHOWING DISTRIBUTION OF MARKS AND HOURS**

Sl. No.	Chapter No.	Chapter Title	Hours	Marks			
				K	C	A	Total Mark
1.	1.0	FACTORS INFLUENCING PERSONALITY DEVELOPMENT	15	6	6	2	14
2.	2.0	SELF DEVELOPMENT	12	4	3	5	12
3.	3.0	NON-VERBAL LANGUAGE	15	4	4	5	13
4.	4.0	MOTIVATION	12	4	4	4	12
5.	5.0	SOCIAL ETIQUETTES	13	4	3	5	12
6.	6.0	SELF IMPROVEMENT	13	4	3	5	12
<b>Total</b>			<b>80</b>	<b>26</b>	<b>23</b>	<b>26</b>	<b>75</b>

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

**(H) SUGGESTED IMPLEMENTATION STRATEGIES:**

- Importance of the human element in service industry should be highlighted.
- Emphasis on listening and speaking skills.
- Interactive sessions to help build confidence.
- Role-play should be stressed at all levels in the organisation.
- Personal grooming should be checked daily

**(I) SUGGESTED LEARNING RESOURCES :**

**(a) Reference Books:**

S. No	Title	Author, Publisher, Edition & year
1.	Interpersonal Skills for Hospitality Management	Mona Clark International Thomson Business Press, 1996

**(b) Others:**

- P.A. System
- Internet
- Microphone

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**(J) SUGGESTED LIST OF PRACTICAL:**

**Hours:**                      **Marks:**

Not Applicable

- (A) COURSE TITLE AND CODE : BASIC ELECTRONICS (ECE-205)
- (B) LEVEL : TWO
- (C) BRANCH/DISCIPLINE : ELECTRONICS &  
COMMUNICATION ENGINEERING
- (D) RATIONALE :

As the entire electronic instruments/appliances are made up of basic electronic circuits, this course is introduced to equip the student with concepts, facts & working principles of some basic electronic circuits. This course will develop skills to identify and test the simple circuits used for various application. This is intended to develop supervisory skill and investigating skills used in the industry. Students will learn concept & principle of voltage regulators. They will also learn the concept of single stage, multistage amplifiers and tuned amplifiers. Students will develop the understanding of multivibrators and oscillators. They will also gain basic knowledge of pulse and switching circuits.

- (E) TEACHING AND EXAMINATION SCHEME:

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
2	G- 205	Basic Electronics		3	1	2	6	75	25	50	25	175

- (F) DETAILED COURSE CONTENTS

**CHAPTER – 1 OVERVIEW OF SEMICONDUCTORS**

- Diodes
- Transistors
- FET

**CHAPTER – 2 RECTIFIERS & FILTERS**

- Half wave rectifiers
- Full wave rectifiers (Center-tap & Bridge)
- Ripple factor, PIV, rectification efficiency, comparison, merits and demerits of different types of rectifier
- D.C. improvement techniques - a) RC filter b) LC filter c)  $\pi$ -filter
- Zener Diode as Shunt regulator

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- Transistor Series regulator (using single transistor)
  - Complete D.C. Power Supply Circuit (using series regulator comparator & current limiter stage.)

### **CHAPTER – 3      FEEDBACK AMPLIFIERS**

- **Concept of feedback, block diagram of feedback systems, feedback factor  $\beta$  (Beta)**
- **Types of feedback, strengths and limitations of negative feedback**
- **Feedback connections- voltage-series, voltage-shunt, current-series, current shunt**
- **Single stage amplifier – working, effect of negative feedback**
- **Emitter follower circuit – effect of negative feedback**
- **Feedback with & without bypass capacitor in single stage CE amplifier**

### **CHAPTER – 4      MULTISTAGE AMPLIFIERS**

- General block diagram of multi-stage amplifier, necessity of multistage amplifiers
- Different coupling methods – working, frequency response, applications and comparison of:
  - a) RC coupled
  - b) LC coupled
  - c) Direct-coupled and
  - d) Transformer coupled amplifiers

### **CHAPTER – 5      TUNED AMPLIFIERS**

- **Concept of resonance circuit**
- **Concept of tuned amplifier**
- **Single-tuned voltage amplifier, its frequency response and limitation.**
- **Double-tuned voltage amplifier, its frequency response and limitation**
- **Concept of staggered tuning**

### **CHAPTER – 6      OSCILLATORS**

- Principle of Oscillations; Barkhausen Criteria
- Working of RC Oscillators – phase-shift and Wien bridge; LC Oscillators - tuned collector, tuned base, Hartley and Colpitt's; Crystal Oscillator

### **CHAPTER – 7      PULSE & SWITCHING CIRCUITS**

- **Diode and transistor as a switch**
- **Wave shaping circuits – clipper, clamper, differentiator and integrator using passive components**
- **Multivibrators – Bistable, Monostable and Astable type circuit**

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**(G) SUGGESTED SPECIFICATION TABLE OF MARKS & HOURS DISTRIBUTION**

**Legends:** K=Knowledge level, C= Comprehension Level, A=Application level

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
1.	Overview of semiconductors	3	2	-	-	2
2.	Rectifiers & Filters	5	4	2	4	10
3.	Feedback Amplifiers	7	6	2	4	12
4.	Multistage Amplifiers	7	5	3	4	12
5.	Tuned Amplifiers	8	5	2	5	12
6.	Oscillators	10	5	4	6	15
7.	Pulse & Switching Circuits	8	5	3	6	12
<b>Total</b>		<b>48</b>				<b>75</b>

**NOTE:** For the entire course, 16hrs of tutorial has been allotted to be used effectively to justify the need of the students and importance of the specific topics.

**(H) SUGGESTED IMPLEMENTATION STRATEGIES**

In totality the implementation strategy to teach this course should be a good mix of the various teaching methods like lecture, question answer, assignment and lab. work. However, for this course some small mini-projects (appearing in some good do-it-yourself magazines like 'Electronics for you' etc.) that could be done in the home or in the lab could be attempted.

**(I) SUGGESTED LEARNING RESOURCES**

1. Textbooks mentioned in the references
2. Laboratory manuals
3. Some electronics engineering magazines.

**(J) SUGGESTED PRACTICAL EXPERIENCES (Marks –50)**

Depending upon the time available, of the following list, two or three experiences could be undertaken in one laboratory session.

- a) Plot the V/I characteristics of a semiconductor diode
- b) Assemble Half Wave Rectifier and compare the input and output waveforms
- c) Assemble and test Full Wave Rectifier with and without filters.
- d) Performance of Bridge Rectifier with filter.
- e) Calculate load and line regulation of Zener Diode Shunt Regulator.
- f) Performance of Series Voltage Regulator.
- g) Effect of negative feedback on single stage amplifier.
- h) Performance of Direct coupled amplifier.
- i) Assemble an RC coupled amplifier and test it.
- j) Performance of Single and Double tuned amplifier.

- k) Performance of LC Hartley and Colpitt's oscillator.
- l) Assemble and test phase shift oscillator.
- m) Performance analysis of crystal oscillator.
- n) Compare waveform of clipper and clamper circuits.**
- o) Performance of Differentiator & Integrator.**
- p) Performance of Bistable Multivibrator.**
- q) Performance of Monostable Multivibrator.**
- r) Performance of Astable Multivibrator.**

**(K) REFERENCES**

<b>S. No.</b>	<b>Title</b>	<b>Author/ Publisher/Edition/Year</b>
1	Electronic Circuits & Systems.	Bapat, Tata McGraw Hill; New Delhi, 1 <sup>st</sup> , 1988
2	Basic Electronics & Linear circuits	Bhargava & Gupta, Tata McGraw Hill; New Delhi, 2 <sup>nd</sup> , 1988
3	Digital Electronics	Bignell, James & Donovan Robert; Delmar, Thomson Learning, Singapore, www.delmar.com, 1 <sup>st</sup> , 2000
4	Practical Semiconductor Data manuals.	BPB Publications; New Delhi, 1 <sup>st</sup> , 1997
5	Op Amps & Linear Integrated Circuits	Fiore, James M.; Delmar, Thomson Learning, Singapore, www.delmar.com 1 <sup>st</sup> , 2001
6	Electronic Circuits & Applications	Grob, McGraw Hill International Ltd., 8 <sup>th</sup> , 1994
7	Electronic Principles	Malvino, Tata McGraw Hill; New Delhi, 3 <sup>rd</sup> , 1995
8	Principles of Electronics	Mehta, V.K., S. Chand & Co. Ltd., 4 <sup>th</sup> , 2000
9	Electronic Devices & Circuits - Vol. 1	Mithal, G.K., Khanna Publishers; New Delhi, 22 <sup>nd</sup> , 1999
10	Electronic Devices and Circuits - An Introduction	Mottershead, Allen, Prentice Hall India, New Delhi, 22 <sup>nd</sup> , 2000
11	Transistor selector data manual	Towers International, BPB Publications.; New Delhi, 1 <sup>st</sup> , 1990
12	Laboratory Manual and Teacher Guide in Basic Electronics	TTTI, Bhopal and DTE, Goa, 1 <sup>st</sup> , 2001

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- (A) **COURSE TITLE AND CODE : ELECTRICAL FUNDAMENTALS & MEASURING INSTRUMENTS (ECE-403)**
- (B) **LEVEL : FOUR**
- (C) **BRANCH/DISCIPLINE : ELECTRONICS & COMMUNICATION ENGINEERING**
- (D) **RATIONALE :**

This course is intended to enable the student understand the very basic facts, concepts and principles of electricity so that student will be able to apply the same for solving simple electric and magnetic circuit and which is the basic requirement to understand many other courses in this discipline. This course also aims at enabling the student to understand the concepts and test procedure so as to build in the student the skills that will enable him/her in doing and guiding investigation which in turn will help him/her to discharge the role as a supervisor or as a entrepreneur.

- (E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	EC-403	Electrical Fundamentals & Measuring Instruments		3	1	2	6	75	25	50	25	175

- (F) **DETAILED COURSE CONTENTS:**

**Chapter – 1 Basic Concepts of Electrical Engineering**

- Concept of current (D.C./A.C.)
- Concept of voltage (D.C. /A.C.)
  - E.M.F.
  - Potential difference
  - Terminal voltage
- Concept of Resistance
- Concept of conductor, insulator, semiconductor

**Chapter – 2 Sources of Electrical Energy**

- Classification
  - Conventional / Non-conventional energy sources



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- A.C./D.C. sources
  - Storage Batteries
    - Types-primary cell, secondary cell & their examples
    - General specifications of a battery
    - Working – chemical reactions (charging / discharging)
    - Concept of efficiency of a battery (ampere hour efficiency, watt hour efficiency)
  - Introduction to A.C. supply systems
    - Single-phase system
    - Three phase system (star and delta connection)

### **Chapter – 3 Electrical Circuit Fundamentals**

- Introduction
- Concept of electric circuit (components)
  - Review of Ohm's law
  - Supply (specifications)
  - Switch (function)
  - Fuse – (necessity & types)
  - Electrical load

### **Chapter – 4 Types of Electrical Circuits**

- Series and parallel connection of resistors
- Star and delta connection
- Star-delta conversion.
- Kirchhoff's laws & application of laws to simple circuits
- Problems based on above types of circuits & laws

### **Chapter – 5 Capacitors**

- Concept of capacitor formation, expression for capacitance
- Energy stored in capacitor
- Dielectric loss
- Dielectric materials used in capacitors, types of capacitors
- Effect of dielectric media on capacitance
  - Electric field strength
  - Electric flux density
  - Permittivity
- Expression for capacitance of parallel plate capacitor
- Series & parallel combination of capacitors
- Charging and discharging of capacitors (no derivation, only numericals)
- A.C./D.C. capacitors and applications

### **Chapter – 6 Inductors**

- Construction of inductors of different types
- Rise and decay of current in an inductor (No derivation, only numericals)
- Energy stored in inductor (No derivation, only numericals)
- Inductance in A.C. and D.C. circuits

### **Chapter –7 Magnetic Circuits**

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- Concept of magnetic flux
  - Concept of electromagnetism
    - Magnetomotive force
    - Magnetic field strength
    - Permeability
    - Reluctance
  - Magnetic leakage, leakage coefficient
  - Magnetic circuits
    - Uniform magnetic circuits
    - Series & parallel circuits
  - Comparison of electric & magnetic circuits

#### **Chapter – 8 Electromagnetic Induction**

- Review of Faraday's laws of electromagnetic induction
- Types of induced E.M.F's
- Fleming's R.H. rule; direction of induced E.M.F.
- Concept of self and mutual inductances
- Expression for self and mutual inductances
  - Application of Faraday's laws
- Interaction between two or more magnetic field
- Force on a current carrying conductor placed in a magnetic field
- Fleming's L.H. rule
- Numericals on above

#### **Chapter – 9 Basic Concepts of Electrical Measuring Instruments**

- Measuring systems
- Classifications
- Necessity of different torques and arrangement of torque producing system
- General description of PMMC, moving iron, dynamometers type instruments
- Calibration of instruments and standard of calibration

#### **Chapter – 10 Current and Voltage Measurement**

- Principle of current measurement
- Galvanometer
- Ammeter
- Extension of current range
- Calibration of ammeter
- Principle of voltage measurement
- Voltmeters
- Extension of voltage range
- Calibration of voltmeter

#### **Chapter – 11 Range Modification**

- C.T. & P.T., principle of working and connections
- Shunt and multipliers

#### **Chapter – 12 Power and Energy Measurement**

- Principle of power measurement

- Wattmeter
- Extension of wattmeter range
- Calibration of wattmeter
- Effect of P.F. on the wattmeter measurement
- KVAR meter
- Principle of energy measurement
- Energy meter
- Extension of range
- Errors & their correction
- Calibration of energy meter

**Chapter – 13 Measurement of Other Quantities**

- P.F. meter
- Frequency meter
- Phase sequence and maximum demand indicator
- Synchroscope
- Clip-on meter
- Megger

**Chapter – 14 Comparison Method**

- Principle of comparison
- Null point
- Bridge type
- Potentiometer type

**Chapter – 15 Measurement of Electrical Circuit Parameters**

- Measurement of resistance bridge type system
- Measurement of insulation resistance
- Measurement of earth resistance
- Measurement of unknown capacitance by schering bridge

**(G) SUGGESTED SPECIFICATION TABLE OF MARKS & HOURS DISTRIBUTION**

**Legends:** K=Knowledge level, C= Comprehension Level, A=Application level

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
1.0	Basic Concepts of Electrical Engineering	2	2	2	-	4
1.0	Sources of Electrical Energy	3	3	2	-	5
1.0	Electrical Circuit Fundamentals	4	4	2	-	6
1.0	Types of Electrical Circuits	4	4	2	-	6
1.0	Capacitors	2	2	-	2	4
1.0	Inductors	2	2	-	2	4
1.0	Magnetic Circuits	4	2	2	-	6
1.0	Electromagnetic Induction	3	2	2	-	4
1.0	Basic Concepts of Electrical Measuring Instruments	4	2	4	-	6

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
1.0	Current and Voltage Measurement	2	2	-	2	4
1.0	Range Modification	3	2	2	-	4
1.0	Power and Energy Measurement	4	2	2	2	6
1.0	Measurement of Other Quantities	4	2	2	2	6
1.0	Comparison Method	3	2	-	2	4
1.0	Measurement of Electrical Circuit Parameters	4	2	-	4	6
<b>Total</b>		<b>48</b>				<b>75</b>

**NOTE:** For the entire course, 16hrs of tutorial has been allotted to be used effectively to justify the need of the students and importance of the specific topics.

### (H) SUGGESTED IMPLEMENTATION STRATEGIES

The implementation strategy to teach this course should be a good mix of the various teaching methods like lecture, question-answer, assignment & lab.work. More drill and practice of numerical will be useful. Home and classroom assignments would prove more useful to develop the analytical skills. As this will be the first exposure to an electrical laboratory, the procedure of lab practices should be in more detail including the safe practices to be followed.

### (I) SUGGESTED LEARNING RESOURCES

4. Textbooks mentioned in the references.
5. Instruction manuals and brochures from instrument suppliers
6. Periodicals like magazines, journals etc.
7. OHP transparencies.

### (J) SUGGESTED PRACTICAL EXPERIENCES (Marks –50)

- a) Electrical engineering laboratory practices
  - i. Supply system & safety.
  - ii. Introduction to use of various test and measuring instruments.
- b) Difference between EMF, terminal voltage & voltage drop in practice.
- c) Application of rheostat as Regulator.
- d) Potential divider.
- e) Maintenance, charging process & maintenance procedure of storage batteries.
- f) Behaviour of fuse under normal & abnormal (overload, short circuit) operating conditions.
- g) Effect of series & parallel connection of two lamps on current, voltage, power dissipated & energy consumed in a given circuit.
- h) Kirchoff's laws (I & II) for simple electric circuits.
- i) Performance of various types of capacitors.
- j) Demonstration of Faraday's laws of electromagnetic induction.
- k) Rise and decay of current in an inductor.
- l) Study cut-section of different meters, such as: Ammeter, voltmeter, wattmeter & energy meter.
- m) Measurement of electrical quantities by low range meter along with
  - iii. Shunt, multiplier, C.T. & P.T.

- n) Measurement of active & reactive power in 3-phase balance load circuit by one wattmeter method.
- o) Measurement of active & reactive power in 3-phase unbalance load circuit by two-wattmeter method. Effect of load PF.
- p) Calibration of energy meter at various P.F. by Standard energy meter, Meter test bench
- q) Performance of
  - iv. Clip-on meter, Phase sequence meter
  - v.P.F. & frequency meter
  - vi.Maximum demand indicator KVA, KWH & KVAR meter.
- r) Measurement of low & medium resistance by Wheastone bridge.
- s) Measurement of low resistance by Kelvin double bridge.
- t) Measurement of earth resistance.
- u) Measurement of insulation resistance by Megger.
- v) Use of potentiometer for the measurement of resistance and EMF
- w) Calibration of DC voltmeter and ammeter by potentiometer
- x) Measurement of circuit parameters by L.C.R. meter.

**(K) SUGGESTED REFERENCES**

S. No.	Title	Author/ Publisher/Edition/Year
13	Principles of Electrical Engineering	Bhattacharya, Tata -McGraw-Hill, New Delhi, 1997
14	Electrical Devices & Circuits	Bogart, T.F., Universal Book Staff, New Delhi, 1 <sup>st</sup> , 1991
15	Electrical Technology	Cotton, H., ELBS, London, Latest
16	Electrical Engineering Vol. I & II	Dawes, Chesteri, McGraw Hill, Book Co. New York, Latest
17	Principles of Electrical engineering	Del Toro, Vincent, Prentice Hall of India, New Delhi, Latest
18	Elementary Electrical Engineering	Gupta, M.L.New Heights, New Delhi, 18 <sup>th</sup> , 1992
19	Electrical Technology	Hughes, Edward, Longman, London, 1 <sup>st</sup> , 1990
20	Basic Electrical Engineering	Mittle, V.N. Tata McGraw-Hill, New Delhi, 1990
21	A Textbook of Electrical Technology	Theraja, B.L. & Theraja, A.K., Chand and Co. New Delhi, Latest
22	Instrumentation for Engineering Measurements	Cerni & Foster; Tata McGraw Hill, New Delhi, Latest
23	Electronic instrumentation & measurement techniques	Cooper, W.D. & Helfrick, A.D., New Delhi: Prentice Hall of India, Latest
24	Electrical & electronic measurement & instruments	Rambhadran, S,;Delhi: Khanna Publishers, 1 <sup>st</sup> , 1994
25	Electronic Measurements & Instrumentation	Rao & Sutrave; Nirali Prakashan, Pune, Latest
26	A course in Electrical & Electronic Measurements & Instruments	Sawhney; Dhanpatrai & Sons, Delhi, 11 <sup>th</sup> , 2 000
27	Electrical measurements &	Suryanarayana, New Delhi, Tata McGraw

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	measuring instruments	Hill, 1 <sup>st</sup> , 1994
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- (A) **COURSE TITLE AND CODE : ELECTRICAL MACHINES  
(ECE405)**
- (B) **LEVEL : FOUR**
- (C) **BRANCH/DISCIPLINE : ELECTRONICS &  
COMMUNICATION ENGINEERING**
- (D) **RATIONALE :**

This course is intended to enable the student to understand the concepts and principles, regarding the operations, testing and maintenance of electric machines, especially transformers, DC machines, and AC machines. The transformers are used in power systems for transmission and distribution of electric power. DC machines are used in various applications like certain electric locomotives, paper mills etc. AC machines are widely used in various applications like blowers, water pumping stations, etc. This course will help the student to function confidently in his/her career especially if he/she working in manufacturing industry or as an entrepreneur for control of electric machines and applications of electrical energy.

- (E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	EC-405	Electrical Machines		3	1	2	6	75	25	50	25	175

- (F) **DETAILED COURSE CONTENTS:**

**Chapter – 1 Single Phase Transformers**

- Construction of a single phase transformer
- Types of single phase transformers
- Principle of working, emf equations
- Voltage & current ratios
- Ratings of transformer
- No load & on load operation
- Open circuit test
- Short circuit test
- Equivalent circuit diagram single phase transformer
- Regulation of a transformer
- Parallel operation of single phase transformers
- Losses and efficiency
- Auto transformer

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- Three phase transformer

**Chapter – 2 Three Phase Transformers**

- Construction of a typical three phase transformers
- Different types of three phase transformers
- Ratings of transformer
- Power transformers and distribution transformers
- Different types of transformer terminal connection
- Maintenance of transformers

**Chapter – 3 Basic Concepts of D.C. Machines**

- Need
- Construction of D.C. machines
- Materials used for constructional parts

**Chapter – 4 D.C. Generators & Motors**

- D.C. generator working principle
- Types of D.C. motors
- Principle of working, back emf equations, Torque equations
- Speed torque characteristics
- Speed control of shunt & series motors
- Reversing of D.C. motors
- Necessity of starters
- Losses & efficiency
- Condition for maximum efficiency

**Chapter – 5 Basic Features of A.C. Machines**

- Overview of AC machines
- Working principle of alternators
- Construction of typical alternator
- Difference between A.C. & D.C. Machines
- Parts of A.C. Machine & their functions
- Materials used for the various parts
- Stator & rotor windings

**Chapter – 6 Single Phase & Three Phase Induction Motors**

- Construction of a single phase induction motor
- Stator & rotor parts, functions, windings
- Principle of working of single phase induction motor
- Concept of rotating magnetic fields
- Stator & rotor current equations
- Effect of frequency on slip
- Torque equations
- Condition for maximum torque
- Torque speed curves
- Necessity of induction motor starters and different types
- Methods of speed control of induction motors
- Principle of working of three phase induction motor



- Construction of a three phase induction motor

#### Chapter – 7 FHP Motors

- Construction of Fractional Horse Power (FHP) motors
- Different types of FHP motors
- Principle of working of FHP motors

### (G) SUGGESTED SPECIFICATION TABLE OF MARKS & HOURS DISTRIBUTION

**Legends:** K=Knowledge level, C= Comprehension Level, A=Application level

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
1.0	Single Phase Transformer	08	4	4	5	13
1.0	Three Phase Transformers	05	3	2	2	07
1.0	Basic Concepts of D.C. Machines	05	4	4	-	08
1.0	D.C. Generators & Motors	05	3	5	-	08
1.0	Basic Features of A.C. Machines	08	3	3	6	12
1.0	Single Phase and Three Phase Induction Motor	07	4	4	-	12
1.0	FHP Motors	10	3	3	2	15
	<b>Total</b>	<b>48</b>				<b>75</b>

**NOTE:** For the entire course, 16hrs of tutorial has been allotted to be used effectively to justify the need of the students and importance of the specific topics.

### (H) SUGGESTED IMPLEMENTATION STRATEGIES

The implementation strategy to teach this course should be a good mix of the various teaching methods like lecture, question-answer, assignment and lab. work. More drill and practice of numericals will be useful. Home and classroom assignments would prove more useful to develop the analytical skills.

### (I) SUGGESTED LEARNING RESOURCES

8. Textbooks mentioned in the references.
9. Laboratory manuals
10. Laboratory sheet, workbook etc.

### (J) SUGGESTED PRACTICAL EXPERIENCES (Marks –50)

- a) Voltage & current ratio of 1- $\phi$  & 3- $\phi$  transformer
- b) Performance of a single phase transformer by direct loading
- c) Performance of a single phase transformer by OC & SC test and its regulation
- d) Performance of an auto transformer
- e) Speed torque characteristics of D.C. shunt & series motors
- f) Starting of shunt & series D.C. motors
- g) Effect of speed & field current on induced emf.
- h) Performance of three phase induction motor (no load test and load test)
- i) Determine Torque speed curves of three phase induction motor

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- j) Performance of single phase induction motor (no load test and load test)
  - k) Control of single phase induction motor (speed & direction of rotation)
  - l) Performance of FHP motors (no load test and load test)
  - m) Control of FHP motors (speed & direction of rotation)

**(K) SUGGESTED REFERENCES**

<b>S. No.</b>	<b>Title</b>	<b>Author/ Publisher/Edition/Year</b>
1	Electrical Machines	Bhattacharya, S.K.; Tata McGraw-Hill, New Delhi, 1997
2	Transformers	BHEL Bhopal; Tata McGraw-Hill, New Delhi, 1991
3	Transformers Design & Manufacture	Dasgupta, Indrajit; Tata McGraw-Hill, New Delhi, 1995
4	Elementary Electrical Engineering	Gupta, M.L., New Heights, New Delhi, 18 <sup>th</sup> , 1992
5	Basic Electrical Engineering	Mittle, V.N., Tata McGraw-Hill, New Delhi, Latest
6	Electrical Machines	Nagrath & Kothari; Tata McGraw-Hill, New Delhi, 1996

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- (A) **COURSE TITLE AND CODE : CIRCUITS & NETWORKS  
(ECE-406)**
- (B) **LEVEL : FOUR**
- (C) **BRANCH/DISCIPLINE : ELECTRONICS &  
COMMUNICATION ENGINEERING**
- (D) **RATIONALE :**

This course is classified under basic technology group and is intended to enable the student understand the facts, concepts and principles of the electrical and electronics engineering circuits and how to analyse them, which will enable him/her in doing and guiding, estimating investigation which in turn will help him/her to discharge the role as a supervisor or as an entrepreneur.

- (E) **TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	EC-406	Circuits & Networks		3	1	2	6	75	25	50	25	175

- (F) **DETAILED COURSE CONTENTS:**

**Chapter – 1 Over view of circuits and networks**

**Chapter – 2 Alternating Supply**

- Sinusoidal A.C voltage generation
- Definitions of various terms used in circuits and networks

**Chapter – 3 Basic Circuit Elements**

- Response of basic R, L and C elements to a sinusoidal voltage & current.
- Average power and power factor
- Complex numbers – Rectangular and polar form and conversion between forms
- Phasors

**Chapter – 4 3- $\phi$  A.C. Voltage Generation**

- 3- $\phi$  generation
- Y and  $\Delta$  connected generator, phase sequences

**Chapter – 5 Basic Principles of Circuit Analysis**

- Kirchhoff's voltage law and current law

- Series and parallel connection

**Chapter – 6**

**A.C. Network Theorems**

- Superposition theorem, Thevenin’s theorem, Norton’s theorem
- Maximum power transfer theorem
- Star-Delta transformation

**Chapter – 7**

Analysis of Series and Parallel Circuits

- Series – parallel circuits (voltage, current, power & P.F.)
- Equivalent circuits
- Effective resistance
- Series a.c. circuits – Impedance and phasor diagram, series resonance, quality factor
- Parallel a.c. circuits- admittance and susceptance, phasor diagram, parallel resonance, quality factor

**Chapter – 8**

Analysis of A.C. Networks Using Network Theorems

- Source conversion
- Mesh analysis
- Nodal analysis
- Bridge networks
- Using  $\Delta$ -Y conversion theorem

**Chapter – 9**

Analysis of Circuits and Networks Representing Various 3- $\phi$  Electrical Balanced Supply Systems

**(G) SUGGESTED SPECIFICATION TABLE OF MARKS & HOURS DISTRIBUTION**

**Abbreviations:** K=Knowledge level, C= Comprehension Level, A=Application level

Chapter No.	Chapter Title	Hours	Marks			
			K	C	A	Total Marks
8.	Over view of circuits and networks	3	4	-	-	4
9.	Alternating Supply	4	5	-	-	5
10.	Basic Circuit Elements	6	4	2	-	6
11.	3 $\phi$ A.C. Voltage Generation	5	4	2	-	6
12.	Basic Principles of Circuit Analysis	6	4	2	2	8
13.	A.C. Network Theorems	6	4	2	4	10
14.	Analysis of Series and Parallel Circuits	6	4	2	6	12
15.	Analysis of A.C. networks using Network Theorems	6	4	2	6	12
16.	Analysis of circuits and networks representing various 3 $\phi$ electrical balance supply systems	6	5	5	2	12
<b>Total</b>		<b>48</b>				<b>75</b>

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**NOTE:** For the entire course, 16hrs of tutorial has been allotted to be used effectively to justify the need of the students and importance of the specific topics.

**(H) SUGGESTED IMPLEMENTATION STRATEGIES**

The implementation strategy to teach this course should be a good mix of the various teaching methods like lecture, question answer, assignment and lab. work. More drill and practice numerical home and classroom assignments would prove more useful to develop the analytical skills.

**(I) SUGGESTED LEARNING RESOURCES**

11. Textbooks mentioned in the references
12. Laboratory manuals

**(J) SUGGESTED PRACTICAL EXPERIENCES (Marks –50)**

Depending upon the time available, of the following list, two or three experiences could be undertaken in one laboratory session.

- a) **Determine the various circuit parameters like Amplitude, Average and RMS values, frequencies etc.**
- b) **Rotation of a vector method to plot sine wave**
- c) **Plot the response of basic R, L and C to a A.C. voltage and current, show the relation by phasor diagram.**
- d) **Show the wave form for the 3- $\phi$  generation of voltage and show the relation by phasor diagram..**
- e) **Verify the Kirchoff's Current Law & Kirchoff's Voltage Law for A.C. circuit.**
- f) **Verify the theorems**
  - i. Superposition, Thevenin's.
  - ii. Maximum power transfer theorem for the a.c. circuits.
- g) Find different electrical parameter in R, L.; R.C.; RLC series circuits and draw the phasor diagram; and
  - iii. Determine current and P.F. in each case.
  - iv. Determine and observe the resonance condition.
- h) Find different electrical parameters in R-C & R-L-C parallel circuit & draw the phasor diagram. Find power & P.F. of the circuit; observe parallel resonance condition.

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**(K) SUGGESTED REFERENCES**

<b>S. No.</b>	<b>Title</b>	<b>Author/ Publisher/Edition/Year</b>
28	Schaum's outline of theory and problems of electric circuits	Edminister, J.A., McGraw Hill, Singapore, Latest
29	Schaum's Outline of Electric Circuits	Edminister, Joseph et al; Tata McGraw-Hill, New Delhi, Latest
30	OPAMPS & Linear Integrated Circuits	Fiore, James M.; Delmar, Thomson Learning, Singapore, <a href="http://www.delmar.com">www.delmar.com</a> , 1 <sup>st</sup> . 2001
31	Schaum's 3000 solved problems in electric circuits. Vol I & II	Nasar, S.A., McGraw Hill, New York, Latest
32	Schaum's Solved Problems in Electric Circuits – Book 1	Nasar, Syed ; McGraw-Hill, New York, Latest
33	Schaum's Solved Problems in Electric Circuits - Book 2	Nasar, Syed ; McGraw-Hill, New York, 1989
34	Introduction to electric circuits & machines	Pai, M.A., Affiliated East-West Press, New Delhi, 1 <sup>st</sup> , 1991
35	Circuit & Networks: analysis & synthesis	Sudhakar, Tata McGraw Hill, New Delhi, 1 <sup>st</sup> , 1994

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(A) COURSE TITLE AND CODE : FUNDAMENTALS OF  
TELECOMMUNICATION (ECE- 407)

(B) LEVEL : FOUR

(C) BRANCH/DISCIPLINE : ELECTRONICS &  
COMMUNICATION ENGINEERING

(D) RATIONALE :

A human being cannot live without any mode of communication. Whatever may be the media used for communication the principle is same; it transfers one form of information from one point to other point or many points. Previously, it was a wired communication where telegraphy and telephony information was recorded whether in written form or orally. Now emphasis is given to the wireless communication with multipoint communications and speed of operation, channel sharing, long distance communication features are important. Electronics communication system deals with various modes of communication.

Concepts such as modulation, side band transmission, radiation and propagation, reception and demodulation, which are widely used in the field of analog & digital communication, is dealt in this course.

(E) TEACHING AND EXAMINATION SCHEME:

Sl. No.	Course Code	Name of Course	Teaching Scheme					Examination Scheme				Total Marks
			Pre-requisite	L	T	P	C	Theory		Practical		
								ET	PA	ET	PA	
1.	EC-407	Fundamentals of Telecommunication		3	-	2	5	75	25	50	25	175

(F) DETAILED COURSE CONTENTS:

**Chapter – 1 Communication Fundamentals**

- Transmitter, Receiver, Channel
- Line of sight distance
- Noise distortions
- Gain – frequency plot and its importance.

**Chapter – 2 Modulation Techniques**

- Need & nature of modulation
- Modulation types: AM, FM, PM
- Modulation index
- Sidebands

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- Power contents
  - Bandwidth and noise consideration
- Chapter – 3      Amplitude Modulation**
- Concept & Need of Modulation
  - Types of RF signal Modulation techniques
  - Definition, Representation, Modulation Index, Frequency Spectrum and mathematical expression of Amplitude Modulated wave
  - Power relation in Amplitude Modulation
  - Generation of Amplitude Modulation
  - High level and Low level Modulation
  - Transistorised Amplitude Modulation circuit (Collector Modulated class C amplifier only )
  - Block diagram of Amplitude Modulation transmitter
  - Methods of SSB generation
- Chapter – 4      Frequency Modulation**
- **Definition, waveform, mathematical representation of frequency modulation**
  - **Frequency spectrum of Frequency Modulation wave**
  - **Effect of noise on carrier**
  - **Pre-emphasis De-emphasis – concept, need, circuit**
  - **Methods of FM generation: Direct Method - Basic Reactance Modulator**
  - **Varactor diode modulator; Indirect Method - Block diagram of Frequency Modulation Transmitter**
  - **Definition and mathematical Expression of Phase modulation**
  - **Comparison between AM, FM & PM**
- Chapter – 5      Demodulation Techniques**
- Principle of detection of AM
  - Linear and nonlinear detectors
  - Receivers
    - TRF and superheterodyne
    - Image frequency
    - IF etc
  - FM detection
  - Discriminator, Slope detector, Ratio detector
  - Amplitude limiter
  - Sensitivity, Selectivity, Fidelity
- Chapter – 6                                      Radiation & Propagation of Waves**
- Electromagnetic radiation; Wave-guides
  - Effect of environment wave-guide terminators
  - Propagation of waves - Ground waves, Sky waves, Space waves
  - Troposphere & Ionospheric propagation
- Chapter – 7      Antennas**
- **Basic considerations of Antenna**
  - Radiation mechanism



- Elementary doublet
- Wire radiator's in space
- Resonant and Non resonant Antennas
- Antenna gain & directivity, Antenna resistance
- Bandwidth, Beam width and Polarization
- Effect of ground on Antennas, Effect of Antenna Heights
- Antennas required for radio reception
- Loop Antenna

**Chapter – 8 Microwave Tubes & Circuits**

- Microwave triodes
- Klystron
- Traveling – Wave Tube (TWT)
- Magnetron

**Chapter – 9 Semiconductor Microwave Devices & Circuits**

- Transistors & ICs
- Varactor & step recovery diodes. Frequency multipliers
- Tunnel diodes & negative resistance amplifiers
- Gunn effect & diodes
- Pin diode
- MASERs, LASERs & applications

**(G) SPECIFICATION TABLE OF DISTRIBUTION OF MARKS & HOURS:**

Chapter No.	Name of Chapter	Hours	Marks			
			K	C	A	Total Marks
1.0	Communication fundamentals	10	5	3	4	12
1.0	Modulation techniques	10	5	3	4	12
1.0	Amplitude modulation	6	3	2	2	7
1.0	Frequency modulation	6	3	2	2	7
1.0	Demodulation techniques	8	4	3	2	9
1.0	Radiation & propagation of waves	8	4	3	2	9
1.0	Antennas	6	3	2	2	7
1.0	Microwave tubes & circuits	6	2	2	3	7
1.0	Semiconductor microwave devices & circuits	4	-	2	3	5
<b>Total</b>		<b>48</b>				<b>75</b>

**(H) IMPLEMENTATION STRATEGIES:**

- In this course, only physical explanations of different concepts are expected. Detailed mathematical derivations and analysis is not expected.
- In generation of AM, only one circuit diagram is expected. That is high-level Modulation. [Collector modulation class C amplifier.]
- In SSB topic suppression of unwanted side band methods, only filter method is expected.

- In case of AM mathematical derivation is expected.
- In case of FM /PM mathematical derivation is not expected.
- For better understanding of radio receivers, assembly alignment and troubleshooting a visit to a radio receiver assembly unit should be arranged.
- Since the circuit diagrams RF amplifier, converter and IF amplifiers stages are similar to AM radio receivers discussed in chapter 6, they need not be discussed in the class again.
- Different specifications of radio receivers should be discussed referring to commercial receivers in the market.
- Faults are to be created in different stages in one practical period of two hours. Students should be asked to detect minimum three faults.
- Minimum five practical experiences should be covered on troubleshooting to include 15 different types of faults.

**(I) LEARNING RESOURCES SUGGESTED TO BE USED:**

13. Textbooks mentioned in the references.
14. Laboratory manuals
15. Some electronics engineering journals, magazines.
16. Video programmes and CBT's.

**(J) SUGGESTED LIST OF EXPERIENCES – (Marks –50):**

**Practical Experiences**

- a) Performance of Transistorised AM modulator
- b) Performance of Balanced modulator.
- c) Performance of Frequency Modulation circuit
- d) Determination of fidelity, sensitivity & selectivity of AM receiver.
- e) Alignment of AM receiver using CRO & standard signal generator.

**(K) SUGGESTED REFERENCES**

S. No.	Title	Author/ Publisher/ Edition/Year
36	Electronic communication systems.	George Kennedy, McGraw-Hill Ltd., Singapore, Latest
37	Electronic communication	Dennis Roddy & John Coolen, Prentice Hall of India Pvt. Ltd. New Delhi, 4 <sup>th</sup> ed., 1995
38	Communication Systems	D. D. Ahirrao & N. S. Jadhav, EVEREST Publication Pune, 1 <sup>st</sup> ed., 1998
39	Telecommunications Principles circuits and systems	S.Rambhadran, Khanna Publishers New Delhi, Latest

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