

**CURRICULUM
FOR
THIRD SEMESTER
OF
THREE-YEAR DIPLOMA COURSE
IN
ELECTRONICS
&
COMMUNICATION ENGINEERING**

STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME IN ELECTRONICS & COMM. ENGG. FOR THIRD SEMESTER									
Code	Subjects	Study Scheme			Total Hours L+T+P	Credits			Total Credits L+T+P
		HOURS				L	T	P	
		L	T	P					
PC301	Electronics Devices and Circuits	3	0	0	3	3	0	0	3
PC302	Electronics Devices and Circuits Lab	0	0	2	2	0	0	1	1
PC303	Microprocessors	3	0	0	3	3	0	0	3
PC304	Microprocessors Lab	0	0	2	2	0	0	1	1
PC305	Principles of Communication Engg	3	0	0	3	3	0	0	3
PC306	Principles of Communication Engg Lab	0	0	2	2	0	0	1	1
ES307	Computer Programing and Applications	2	0	0	2	2	0	0	2
ES308	Computer Programing and Applications Lab	0	0	4	4	0	0	2	2
OE309	Open Elective-I	3	0	0	3	3	0	0	3
SI/PR310	Electronic Design Software and Fabrication Techniques	0	0	6	6	0	0	3	3
Total		14	0	16	30	14	0	8	22
Open Elective I :- Renewable Energy Technology/E-governance									

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: PC301	Course Title: Electronic Devices and Circuits
Semester: 3rd	Credits: 3
Periods Per Week : 3 (L:3 , T:0, P: 0)	

COURSE OBJECTIVE:

Having attained basic knowledge of electronic devices like diodes, transistors, and elementary circuits, this course will enable the students to learn about the use of transistors in analog circuits like power amplifier, multistage amplifier, oscillators, and multivibrators etc. It also gives information about timer, operational amplifier, voltage regulator ICs and their applications.

COURSE CONTENTS

UNIT-1.Multistage Amplifiers

- a) Need for multistage amplifier
- b) Gain of multistage amplifier
- c) Types of multistage amplifier:-
 - i)RC coupled,
 - ii) transformer coupled
 - iii) direct coupled
 their frequency response and bandwidth

UNIT-2.Large Signal Amplifiers

- a) Difference between voltage and power amplifiers
- b) Importance of impedance matching in amplifiers
- c) Class A, Class B, Class AB, and Class C amplifiers.
- d) Single ended power amplifiers, Graphical method of calculation (without derivation) of output power.
- e) Double ended power amplifiers:
 - i) Transformer coupled push-pull amplifier
 - ii) Complementary symmetry push-pull amplifier

UNIT-3.Feedback in Amplifiers

- a) Basic principles and types of feedback
- b) Effect of negative feedback on gain, stability, distortion and bandwidth of an amplifier
- c) Negative feedback circuits:
 - i)RC coupled amplifier without emitter bypass capacitor
 - ii)Emitter follower amplifier and its application

UNIT-4.Sinusoidal Oscillators

- a) Use of positive feedback in amplifiers ; Barkhausen criterion for sustained oscillations
- b) Different oscillator circuits- Tuned collector, Hartley, Colpitts, Phase shift, Wien's bridge, and Crystal oscillator. Their working principles (no mathematical derivation)

UNIT-5.Tuned Voltage Amplifiers

- a) Series and parallel resonant circuits and bandwidth of resonant circuits
- b) Single and double tuned voltage amplifiers and their frequency response

UNIT-6.Operational Amplifiers

- a) Characteristics of an ideal operational amplifier and its block diagram
- b) Definition of differential voltage gain, CMRR, PSRR, slew rate and input offset current
- c) Operational amplifier as an inverter, adder, subtractor, differentiator, and integrator
- d) IC 741 pin diagram and explanation of working of each pin

UNIT-7.Electronic Circuits

- a) Simple diode clipping and clamping circuits
- b) 555 Timer IC, pin diagram with explanation of function of each pin.
- c) Use of IC555 as monostable and astable multi-vibrator
- d) introduction to 78XX series and 79XX series voltage regulators
- e) introduction to LM317 IC, pin function and block diagram

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- Describe the Multistage Amplifiers and their types.
- Describe the different classes and types of power amplifiers .
- Analyze negative feedback in amplifiers and study its effect .
- Study different types of oscillator circuits
- Use of tuned voltage amplifiers and operational amplifiers.

RECOMMENDED BOOKS

1. Kulshreshta and SC Gupta, "Basic Electronics and Linear Circuit" by Tata McGraw Hill Education Pvt Ltd., New Delhi.
2. VK Mehta, "Principles of Electrical and Electronics Engineering" by S Chand and Co., New Delhi
3. Robert Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education.

4. Albert Paul Malvino, "Principles of Electronics" by Tata McGraw Hill Education Pvt Ltd., New Delhi.
5. Albert Malvino and David J. Bates, "Basic Electronics – Problems and Solutions" by Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
6. J.S. Katre, Sandeep Bajaj, "Basic Electronics" by Tech. Max. Publications, Pune.
7. SK Sahdev, "Electronic Principles" by DhanpatRai& Co., New Delhi

DISTRIBUTION OF TIME AND MARKS

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1.	Multistage Amplifiers	08	15
2.	Large Signal Amplifiers	10	20
3	Feedback in Amplifiers	04	10
4.	Sinusoidal Oscillators	07	15
5.	Tuned Voltage Amplifiers	04	10
6.	Operational Amplifiers	07	15
7.	Electronic Circuits	08	15
TOTAL		48	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: PC302	Course Title: Electronic Devices and Circuits Lab
Semester: 3rd	Credits: 1
Periods Per Week : 2 (L:0 , T:0, P: 2)	

COURSE OBJECTIVES:

This subject is a lab course to be supplementing the theory subject and aims to develop proficiency and understanding of practical outcomes of the subjects treated in theory.

PRACTICALS EXERCISES

1. To measure the voltage gain of a two stage RC coupled amplifier
2. Plot the frequency response and calculate the bandwidth of a two stage RC coupled amplifier.
3. To measure the gain of a single ended power amplifier.
4. To measure the gain of a push-pull amplifier .
5. To measure the voltage gain of emitter follower circuit and plot its frequency response
6. Plot the frequency response curve of Hartley and Colpitts Oscillator
7. Plot the frequency response curve of phase shift and Wein bridge Oscillator
8. To observe the output waveforms of series and shunt clipping circuits
9. To observe the output for a diode clamping circuit.
10. Use of IC 555 as monostablemultivibrator and observe the output for different values of RC
11. Use of IC 555 as astablemultivibrator and observe the output at different duty cycles
12. To use IC 741 (op-amplifier) as
 - i) Inverter,
 - ii) Adder,
 - iii) Subtractor
 - iv) Integrator
13. To realize positive and negative fixed voltage AC power supply using three terminal voltage regulator IC (7805, 7812, 7905)

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: PC303	Course Title: Microprocessors
Semester: 3rd	Credits: 3
Periods Per Week : 3 (L:3 , T:0, P: 0)	

COURSE OBJECTIVES:

For understanding the Computer organization we take the test case of 8085 microprocessor. The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a computer. It also gives the student a knowledge of instruction set, instruction format and programming at the assembly level .

COURSE CONTENTS

UNIT-1. Introduction

Typical organization of a microcomputer system and functions of its various blocks.

UNIT-2. Architecture of a CPU or a Microprocessor (With reference to 8085 microprocessor)

- A)** Concept of Bus in a computer ; bus organization of 8085
- B)** Register organization in 8085:- Accumulator, Register pairs, Instruction register, program counter ,Memory address register(Using H-Lpair), flag register.
- C)** Memory addressing in 8085. Stack and stack pointer.
- D)** Functional block diagram of 8085 and function of each block,
- E)** Pin details of 8085 with brief function.
- F)** Demultiplexing of address/data bus
- G)** Generation of read/write control signals

UNIT-3. Programming (with respect to 8085 microprocessor)

- A)** Addressing modes
- B)** Instruction format
- C)** Instruction set
- D)** Explanation of the instructions of the following groups of instruction set.
 - I. Data transfer group
 - II. Arithmetic Group
 - III. Logical Group
 - IV. Branching and looping

- V. Sub-routine
- VI. Stack instructions, I/O and Machine Control Group.
- VII. Programming exercises in assembly language. (Examples can be taken from the list of experiments).

UNIT-4. Memories and I/O interfacing

- A. Basic idea of RAM,ROM, PROM, EEPROM.
- B. Memory organization, Concept of memory mapping, partitioning of total memory space. Address decoding
- C. I/O interfacing:-
 - i. Concept of programmed I/O and memory mapped I/O.
 - ii. Concept of Interrupt driven I/O.
 - iii. Concept of Direct Memory Access.
 - iv. Serial data transfer in 8085

UNIT-5. Interrupts

Concept of interrupts, Maskable and non-maskable, Software interrupt,Various hardware interrupts of 8085, Servicing interrupts, extending interrupt system

UNIT-6. Organisation of control unit

- A. Control unit of a computer,its functions.
- B. Instruction cycle, machine cycle and T-states with 8085 as an example.
- C. Fetch and execute cycles,interrupt cycle
- D. Control unit implementation in a computer :-hardwired and micro-programmed design(brief idea)

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- Describe the architecture & organization of 8085 Microprocessor.
- Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
- Relate the addressing modes used in the instructions.
- Realize the Interfacing of memory & various I/O devices with 8085/8086 microprocessor.
- Familiarise the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessors.

- Interface various peripheral IC's with Intel 8085 microprocessor for its various applications

RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi
2. Introduction to Microprocessor by Mathur ,Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Microprocessor and Microcontrollers by Dr BP Singh, Galgotia Publications, New Delhi
4. Microprocessor and Applications by Badri Ram: Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Microprocessor and Microcomputers by Refiquzzaman, Prentice Hall of India Ltd., New Delhi.
6. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi
7. Computer Organisation and Architecture by William Stallings: Prentice Hall of India Ltd., New Delhi
8. Digital Integrated Electronics by Herbert Taub and DonaldSachilling; Prentice Hall of India Ltd., New Delhi
9. Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi
10. Digital Electronics and Microprocessor by Rajiv Sapra, Ishan Publication, Ambala

DISTRIBUTION OF MARKS AND TIME

UNIT	NAME	Time Allotted (Hrs)	Marks Allotted (%)
1.	Introduction	04	10
2.	Architecture of a Microprocessor (With reference to 8085 microprocessor)	10	20
3	Programming (with respect to 8085 Microprocessor)	12	25
4	Memories and I/O interfacing	08	15
5.	Interrupts	08	15
6.	Organisation of control unit	06	15

Total	48	100
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PROGRAM:THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code:PC304

Course Title: Microprocessors Lab

Semester: 3rd

Credits: 1

Periods Per Week : 2 (L:0 , T:0, P: 2)

COURSE OBJECTIVES :

This subject is a lab course to be supplementing the theory subject and aims to develop proficiency and understanding of practical outcomes of the subjects treated in theory.

COURSE CONTENTS:

PRACTICALS EXERCISES

1. Familiarization of different keys of 8085 microprocessor kit and its memory map from its manual.
2. Steps to enter, modify data/program and to execute a program on 8085 kit.
3. Writing and execution of a program for addition of two 8 bit numbers with and without carry.
4. Writing and execution of a program for subtraction of two 8 bit numbers using 2s complement method
5. Writing and execution of a program for Addition of two 16 bit numbers
6. Writing and execution of a program for Subtraction of two 16 bit numbers
7. Writing and execution of a program for Multiplication of two 8 bit numbers

- 8.** Writing and execution of a program for division of two 8 bit numbers
- 9.** Writing and execution of a program for obtaining smallest /largest of three numbers stored in memory locations
- 10.** Writing and execution of a program for arranging 10 numbers in ascending / descending order

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: PC305	Course Title: Principles of Communication Engineering
Semester: 3rd	Credits: 3
Periods Per Week : 3 (L:3 , T:0, P: 0)	

COURSE OBJECTIVES:

The course aims to provide student comprehensive knowledge of the fundamental concept of analog communication systems. Also student will be able to analyze various analog modulation and demodulation techniques and will get the knowhow of different types of transmitters and receivers.

COURSE CONTENTS

UNIT-1.Introduction :

- i)Need for modulation and demodulation in communication systems
- ii)Basic block diagram explanation of a modern communication system.

UNIT-2.Amplitude Modulation:

- i)Definition of amplitude modulation. Expression for an AM wave(no derivation),Carrier and side band components. Modulation index.Bandwidth of AM Wave.
- ii)Elementary idea of DSB-SC, SSB-SC, ISB and VSB modulations and their areas of applications.

UNIT-3.Frequency Modulation:

- i) Definition of frequency modulation .Expression for frequency modulated wave (no derivation), Bandwidth of FM Wave. Modulation index, maximum frequency deviation and deviation ratio.
- ii)Effect of noise on FM carrier, Need for pre-emphasis and de-emphasis.
- iii)Comparison of FM and AM in communication systems

UNIT-4.Phase Modulation :

Expression for phase modulated wave(no derivation), modulation index, comparison with frequency modulation.

UNIT-5.AM &FM Transmitters.

- i) Basic principle of AM modulators and mention of different types .
- ii)Block diagram explanation of AM transmitter and working of each stage
- iii) Basic principle of FM modulators and mention of different types .
- iv)Block diagram explanation of FM transmitter and working of each stage.

UNIT-6. AM and FM Demodulation

i) Demodulation of AM Wave. Working principles of demodulation of AM wave using diode detector or synchronous detection (No derivations; only working principle)

ii) Demodulation of FM wave. Working principles of demodulation of FM wave using slope detector, Foster-seeley discriminator, Ratio detector and PLL demodulator (No derivations ;only working principle)

UNIT-7. Radio receivers

i) Principle of working of super heterodyne AM receiver using block diagram with function of each block and wave form at input and output of each block. Concept/selection criterion of Intermediate frequency

ii) Block diagram of an FM receiver, function of each block and waveforms at input and output of different blocks. Need of limiting and de-emphasis in FM reception.

iii) Performance parameters of a radio receiver: Sensitivity, selectivity, fidelity and signal-to-noise ratio.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- Understand various modulation and demodulation techniques and their practical application in the communication systems.
- Attain knowledge of various types of modulators/demodulators and AM/FM radio receivers. Describe the different classes and types of power amplifiers
- Shall gain theoretical background in maintenance and servicing of various communication systems.
- Understand about the maintenance and servicing of various communication system

RECOMMENDED BOOKS

1. Communication Systems by George Kennedy, Tata McGraw Hill Education Pvt Ltd, New Delhi.
2. Electronic Communication Sytесms by Wayne Tomasi, Pearsons New International Edition.
3. Communication Systems by A.K. Gautam, SK Kataria and Sons, New Delhi.
4. Fundamentals of Communication System by Fitz, Tata McGraw Hill Education Pvt Ltd, New Delhi
5. Electronic Communication System by Roddy and Coolen, Prentice Hall of India, New Delhi.

6. Handbook of Experiments in Electronics and Communication Engineering by S. PoornachandraRao, and B Sasikala, Vikas Publishing House Pvt Ltd, Jangpura, New Delhi

DISTRIBUTION OF TIME AND MARKS

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1.	Introduction	04	10
2.	Amplitude Modulation	06	15
3	Frequency Modulation	06	15
4.	Phase Modulation	04	10
5.	AM &FM Transmitters	10	20
6.	AM and FM Demodulators	06	15
7.	Radio Receivers	06	15
	Total	48	100

PROGRAM:THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code: PC306

Course Title: Principles of Communication Engineering Lab

Semester: 3rd

Credits: 1

Periods Per Week : 2 (L:0 , T:0, P: 2)

COURSE OBJECTIVES :

This subject is a lab course to be supplemented by theory subject and aims to develop proficiency and understanding of practical outcomes of the subjects treated in theory.

COURSE CONTENTS:

PRACTICALS EXERCISES

1. (A) To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation

(B) To measure the modulation index of the AM wave obtained in above practical.
- 2 (A) To obtain an AM wave from a square law modulator circuit and observe waveforms
(B) To measure the modulation index of the obtained wave form.
- 3 To obtain an FM wave and measure the frequency deviation for different modulating signals.
- 4 To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion.
- 5 To obtain modulating signal from a FM detector .
- 6 To observe the waveforms at different stages of a AM /FM transmitter.
- 7 To observe the waveforms at different stages of a Radio Receiver.

PROGRAM:THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: PC307	Course Title: Computer Programming
Semester: 3rd	Credits: 2
Periods Per Week : 2 (L:2 , T:0, P: 0)	

COURSE OBJECTIVE:

Computer programming plays a very vital role in present day life. In order to enable the students use the computers effectively in problem solving, this course offers the programming language C along with exposure to various engineering applications of computers.

COURSE CONTENTS:

1. Algorithm and Program Development

- a) Steps in development of a program
- b) Flow-charts, algorithm development
- c) Introduction to various computer languages
- d) Concept of interpreter, compiler, high level language(HLL), machine language (ML) and Assembly Language

2. Program Structure (C Programming)

- a) Data types, input output statements, arithmetic and logical operations, data assignments, precedence and associativity
- b) I/O statements
Assignment, Variables, arithmetic operation- their precedence, data types standard I/O function, formulated I/O
- c) Control Statements
Logical and relational operators; if-else, while, do- while, for loops, breaks, switch statements
- d) Functions:
Function declaration, parameter passing- by value, storage classes (Local, Global and Static variables), standard library functions
- e) Arrays:
Single and multi-dimensional arrays, character arrays
- f) Pointers:
To various data types, pointers in parameters passing, Basic programs
- g) Structures:

Definition of a structure, pointer to structure, union and array of structure

- h)** Strings:
String processing, functions and standard library function.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- Describe the architecture & organization of 8085 Microprocessor.
- Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
- Relate the addressing modes used in the instructions.
- Realize the Interfacing of memory & various I/O devices with 8085/8086 microprocessor.
- Familiarise the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessors.
- Interface various peripheral IC's with Intel 8085 microprocessor for its various applications

RECOMMENDED BOOKS

1. Programming in C by Balagurusamy, Tata McGraw Hill Education Pvt Ltd, New Delhi
2. Programming in C by Gottfried, Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Programming in C by Kerning Lan and Richie; Prentice Hall of India, New Delhi
4. Let us C- YashwantKanetkar, BPB Publications, New Delhi
5. Vijay Mukhi Series for C and C++
6. Programming in C by R Subburaj, VikasPublishing House Pvt. Ltd., Jangpura, New Delhi
7. Programming in C by Kris A Jansa, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi
8. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi
9. Pointers in C by YashwantKanetkar, BPB Publishers New Delhi

DISTRIBUTION OF TIME AND MARKS

Topic No.	Topic	Time Allotted (Hrs)	Marks Allotted (%)
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1.	Unit-I	08	20
2.	Unit-II	24	80
Total		32	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME INELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: ES308	Course Title: Computer Programming Lab
Semester: 3rd	Credits: 2
Periods Per Week : 4 (L:0 , T:0, P: 4)	

COURSE OBJECTIVES :

This subject is a lab course to be supplementing the theory subject and aims to develop proficiency and understanding of practical outcomes of the subjects treated in theory.

COURSE CONTENTS:

PRACTICALS EXERCISES

1. Programming exercise on executing a C Programs.
2. Programming exercise on editing a C program.
3. Programming exercise on defining variables and assigning values to variables
4. Programming exercise on arithmetic and relation operators
5. Programming exercise on arithmetic expressions and their evaluation
6. Programming exercise on reading a character
7. Programming exercise on writing a character
8. Programming exercise on formatting input using print
9. Programming exercise on formatting output using scan
10. Programming exercise on simple IF statement
11. Programming exercise on IF... ELSE statement
12. Programming exercise on SWITCH statement
13. Programming exercise on GOTO statement
14. Programming exercise on DO-WHILE statement
15. Programming exercise on FOR statement
16. Programming exercise on one dimensional arrays
17. Programming exercise on two dimensional arrays

PROGRAM: THREE YEARS DIPLOMA PROGRAMME INELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: OE309	Course Title: Open Elective – I a)Renewable Energy Technology
Semester: 3rd	Credits: 3
Periods Per Week : 3 (L:3 , T:0, P: 0)	

COURSE OBJECTIVES:

The objective of the course is to provide students with the present and future scenario of world energy use. It also gives knowledge about the various renewable energy sources like solar energy, wind energy and bio energy and their uses. It also make students to get understanding of identifying different available non-conventional energy sources.

COURSE CONTENTS:

UNIT-I: Introduction: World Energy Use; Reserves of Energy Resources; Environmental Aspects of Energy Utilization; Renewable Energy Scenario in India and around the World; Potentials; Achievements / Applications; Economics of renewable energy systems.

Unit-II: Solar energy: Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors; Solar direct Thermal Applications; Solar thermal Power Generation Fundamentals of Solar Photo Voltaic Conversion; Solar Cells; Solar PV Power Generation; Solar PV Applications.

Unit-III: Wind Energy: Wind Data and Energy Estimation; Types of Wind Energy Systems; Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.

Unit-IV: Bio-Energy: Biomass direct combustion; Biomass gasifiers; Biogas plants; Digesters; Ethanol production; Bio diesel; Cogeneration; Biomass Applications.

Unit-V: Other Renewable Energy Sources: Tidal energy; Wave Energy; Open and Closed OTEC Cy- cles; Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems.

COURSE OUTCOMES:

After undergoing the subject, the students will be able to:

- Understand present and future energy scenario of the world..
- Understand various methods of solar energy harvesting. .
- Identify various wind energy systems..
- Evaluate appropriate methods for Bio energy generations from various Bio wastes
- Identify suitable energy sources for a location.

RECOMMENDED BOOKS:

1. O.P. Gupta, Energy Technology, Khanna Publishing House, Delhi (ed. 2018)
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN Spon Ltd., UK, 2006.
3. Solar Energy, Sukhatme. S.P., Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press,U.K., 1996.
5. Fundamental of Renewable Energy Sources, GN Tiwari and MK Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment-A Policy Analysis for India, NH Ravindranath, UK Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, RA Ristinen and J JKraushaar, Second Edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, JW Twidell and AD Weir, ELBS, 2006.

DISTRIBUTION OF TIME AND MARKS

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Unit1	08	20
2	Unit2	08	20
3.	Unit3	08	20
4.	Unit4	10	20
5.	Unit5	10	20
	Total	48	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: OE 309	Course Title: Open Elective-I b) Introduction to e-Governance
Semester: 3rd	Credits: 3
Periods Per Week : 3 (L: 3, T:0, P: 0)	

COURSE OBJECTIVES :

This subject covers the concepts of e-Governance and makes one understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

COURSE CONTENTS:

UNIT-1. Introduction to Emerging Trends in ICT

Exposure to emerging trends in ICT for development; Understanding of design and implementation of e-Government projects, e-governance lifecycle.

UNIT-2. Modernizing Governance

Need for Government Process Re-engineering (GPR); National e-Governance Plan(NeGP) for India; SMART Governments & Thumb Rules

UNIT-3. E-Governance Framework

Architecture and models of e-Governance, including Public Private Partnership (PPP); Need for Innovation and Change Management in e-Governance; Critical Success Factors; Major issue including corruption, resistance for change, e-Security and Cyber laws

UNIT-4. E-Governance Implementation Strategies

Focusing on Indian initiatives and their impact on citizens; Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context. Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

UNIT-5. Case Study in E-Governance Project

Mini Projects by students in groups – primarily evaluation of various e-governance projects.

COURSE OUTCOMES:

After studying the course a student will be aware about the practices and principles of e-governance and its key role in bridging the gulf between the government and the people.

RECOMMENDED BOOKS& RESOURCES:

- 1 Managing Transformation –Objectives to Outcomes. J Satyanarayana, Prentice Hall India
- 2 The State, IT and Development. Kenneth Kenniston, RKBagga and Rohit Raj Mathur, Sage Publications India Pvt Ltd.
- 3 e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall, India
- 4 <http://www.csi-sigegov.org/publications.php>
- 5 <https://negd.gov.in>
- 6 <https://www.nisg.org/case-studies-on-e-governance-in-india>

DISTRIBUTION OF TIME AND MARKS

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Unit1	08	14
2	Unit2	08	18
3.	Unit3	08	18
4.	Unit4	12	25
5.	Unit5	12	25
	Total	48	100

PROGRAM:THREE YEARS DIPLOMA PROGRAMME IN ELECTRONICS AND COMMUNICATION ENGINEERING	
Course Code: EI/PR310	Course Title: Electronic Design Software and Fabrication Techniques
Semester: 3rd	Credits: 3
Periods Per Week : 6 (L:0 , T:0, P: 6)	

COURSE OBJECTIVES:

This course aims to introduce a student to the competencies needed in design of circuits and PCBs by working on simple designs , their simulation and fabrication.

DETAILED CONTENTS:

1. Introduction.

- 1.1. Identification of commonly used active and passive electronic components (including linear ICs and digital ICs) like fixed resistors , variable resistors , potentiometers , sensing resistors (such as temperature or light operated) , fixed capacitors , variable capacitors , electrolytic capacitors , diodes , Zener diodes , light emitting diodes (LEDs) , transistors , thyristors , thermistors , analogue or digital integrated circuits , surface mount packages , rectifiers , switches , mini transformers , decoders , regulators , encoders or resolvers , inverters or servo controllers , edge connectors , wiring pins/tags/wire links , fixing spacers , insulators , small heat sinks , cables , cable connectors , protection devices , opto-electronics/optical fibre components.
- 1.2 Review of skills in assembly of components, soldering, and soldering techniques.
- 1.3 Brief review of use of tools used in design, testing and fabrication like oscilloscope, multimeter, power supply, heat shunts/tweezers , snipe or long nosed pliers , sleeving pliers, wire strippers , side or end cutters , bolt fasteners (screwdriver, spanners) , anti-static packaging, strap-set etc.

2. Design and Simulation Tools

2.1 Study of an electronic circuit using its circuit diagram and comprehension of its working.The following are given as example and are not exhaustive:-

- 1)Simple power supply design.
- 2)Transistor as a relay driver.
- 3)Single stage amplifier.
- 4)A simple oscillator circuit.
- 5) Astablemultivibrator using 555.

6) Op amp based differentiator.

2.2 Use of any of the online interactive simulators (available at <http://library.io> ,Multisim Live etc.) or freeware or trial version of propriety softwares like LTSpice, Circuit lab ,TINA-TI, Proteus, MicroCap , Multisim, Eagle ,Circuit Maker, etc. for simulating the above circuits.

3. PCB Fabrication Techniques

3.1) Theoretical concepts of fabrication of Printed Circuit Boards (PCBs):

- a) PCB board materials, their characteristics and plating, corrosion and its prevention.
- b) Standards of board sizes. Modular assemblies.edge connectors, multi board racks, flexible boards,
- c) Concept of SMDs (Surface Mount Devices)
- d) Use of PCB designing software to create layouts.

3.2) Practically fabricating of a PCB for any circuit of choice using manual method of art work and photolithography or by a semi or fully automatic PCB prototype machine.

4.Assembly and Testing

4.1 Using a multipurpose PCB/prototype general PCB for assembling a circuit of choice using manual method.

4.2 Knowledge of wave soldering technique .

4.3 Knowledge of PCB drilling techniques using manual and computer controlled machines(like laser drilling).

4.4 Knowledge of Plating or surface finish , solder resist application, legends or silk screens

4.5 Pre –assembly bare board testing of PCBs .Post-assembly testing of circuitry like In- circuit testing etc.

COURSE OUTCOMES:

After undergoing the subject, the students will be able to:

- Study the fundamental concept of Design of Electronic Circuits
- To use various software tools for checking the response of design circuits
- To fabricate the designed model on printed circuit board.

RECOMMENDED BOOKS:

- 1.** Printed Circuit Board by Bosshart
- 2.** Printed Circuit Board by RS Khandpur, Tata McGraw Hill Education Pvt Ltd., New Delhi
- 3.** Electronics Techniques by Rajesh Kumar, NITTTR, Chandigarh
- 4.** Modular CAD for PCBs using EAGLE Software by Rajesh Kumar, NITTTR, Chandigarh
- 5.** Electronic Manufacturing Technology by KS Jamwal, DhanpatRai and Sons, New Delhi