



# **St. PETER'S UNIVERSITY**

**St. Peter's Institute of Higher Education and Research**

**(Declared Under Section 3 of the UGC Act, 1956)**

**AVADI, CHENNAI – 600 054**

**TAMIL NADU**

**M.Sc. (ELECTRONICS)**

**Code No. - 427**

**(Effective From 2009 – 2010)**

**(Distance Education)**

**Regulations and Syllabi**

**(I & II Year)**

**St. PETER'S INSTITUTE OF DISTANCE EDUCATION**

**Recognized by Distance Education Council and**

**Joint Committee of UGC – AICTE - DEC, New Delhi**

**(Ref. F. No. DEC/SPU/CHN/TN/Recog/09/14 dated 02.04.2009 and**

**Ref.F.No.DEC/Recog/2009/3169 dated 09.09.2009)**

# **St. PETER'S UNIVERSITY**

## **St. PETER'S INSTITUTE OF DISTANCE EDUCATION**

**Chennai – 600 054.**

**Code No. – 427**

### **M.Sc. (ELECTRONICS)**

(Distance Education)

#### **Regulations and Syllabi**

(Effective from 2009 – 2010)

- 1. Eligibility:** A Candidate who has passed B.Sc. Examination with Electronics as main subject of study or B.Sc. Degree Examination in Physics or any other specialization in Electronics of other University recognized as equivalent thereto, are eligible for admission to Two Year M.Sc. Programme in Electronics.
- 2. Duration:** Two Years.
- 3. Medium:** English is the medium of instruction and examination.
- 4. Methodology:** The methodology of distance education includes the supply of self-instructional study materials in print format and in CD, face-to-face instruction for theory and practicals for a limited period during week ends and on holidays, provision of virtual class in phased manner, dissemination of information over e-mail, Student - Support Service at various Centres of the University, Continuous Assessment and End Assessment conducted by the University at various parts of India.
- 5. Weightage for Continuous and End Assessment:** There is no weightage for Continuous Assessment unless the ratio is specifically mentioned in the scheme of Examinations. The End Assessment (EA) has 100% weightage.
- 6. Credit System:** Credit system be followed with 36 credits for each Year and each credit is equivalent to 25-30 hours of effective study provided in the Time Table of the formal system.

## 7. Scheme of Examinations

### First Year

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
109PELT01	Electronic Devices and Applications of IC'S	6	100	100
109PELT02	Advanced Microprocessor	6	100	100
109PELT03	Digital and Optical Communication Engineering	8	100	100
109PELT04	Power Electronics & VLSI Design	8	100	100
109PELP01	Practical I – Electronics Lab Record	8	90 10	100
	<b>TOTAL</b>	<b>36</b>	<b>500</b>	<b>500</b>

### Second Year

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
209PELT01	Wireless Communication	6	100	100
209PELT02	Advanced Networks	8	100	100
209PELT03	C++ and Java Programming	6	100	100
209PELP01	Practical II- Microprocessor and Communication lab Record	8	90 10	100
209PELP02	Project work & viva – Voce	8	100	100
	<b>TOTAL</b>	<b>36</b>	<b>500</b>	<b>500</b>

**8. Passing Requirements:** The minimum pass mark (raw score) be 50% in End Assessment.

**9. Grading System:** Grading System on a 10 Point Scale be followed with 1 mark = 0.1 and the conversion of the Grade point as given below.

$$\begin{aligned} \text{Overall Grade Point Average (OGPA)} &= \frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}} \\ &= \frac{\sum (EA)C}{\sum C} \end{aligned}$$

**10. The Overall Grade:** The Overall Grade and Classification of all successful candidates be arrived at from the Overall Grade Point Average as stipulated in the following conversion Table.

Grade	Over all Grade Point Average(OGPA)	Over all weighted Average marks	Classification
O	9.00 to 10.00	90.00 to 100	First Class
A	8.00 to 8.99	80.00 to 89.99	First Class
B	7.00 to 7.99	70.00 to 79.99	First Class
C	6.00 to 6.99	60.00 to 69.99	First Class
D	5.00 to 5.99	50.00 to 59.99	Second Class
F	0.00 to 4.99	0.00 to 49.99	<b>Fail</b>

The Grade Sheets of successful candidates provide particulars such as (1) Overall weighted Average Marks, (2) Overall Grade Point Average,(3) Overall Grade and (4) Overall classification.

**11. Pattern of the Question Paper:** The question paper for End Assessment will be set for three hours and for the maximum of 100 marks with following divisions and details.

**Part A:** 10 questions (with equal distribution to all units in the syllabus). Each question carries 2 marks.

**Part B:** 5 questions with either or type (with equal distribution to all units in the syllabus). Each question carries 16 marks.

The total marks scored by the candidates will be reduced to the maximum prescribed in the Regulations.

**12. Syllabus**

# **109PELT01: ELECTRONIC DEVICES AND APPLICATIONS OF IC'S**

## **Unit – I**

Working and Characteristics of Junction diode, Zener diode and tunnel diode. Working of IMPATT diode, PIN diode. Construction and V-I characteristics of thermistors, Gunn effect diode, Varactor diode, Photoconductive devices - Photoconductive cells, photo diodes, LED, Solar Cells - MEMS and Nano Technology

## **Unit -II**

Construction – operation and Characteristics of a Bipolar transistor- biasing of a transistor – base bias, collector to base bias and self bias. Causes of shift of Quiescent operating point. Stability factor- Hybrid parameters- Construction, operation and Characteristics of SCR, UJT, JFET and MOSFET - Biasing of JFET- Multivibrators.

## **Unit - III**

IC Fabrication: classification – fundamentals of monolithic IC technology – basic planer processes: Silicon wafer preparation – Epitaxial growth – Oxidation – photolithography – Diffusion – Isolation – Metallization – monolithic transistors – monolithic diodes – integrated resistors – integrated capacitors – thin and thick film technology

## **Unit - IV**

Digital IC's: Basic terms related to digital IC's – RTL and DTL circuits – Integrated Injection logic - TTL – Open collector output – Totem pole output – Schottky TTL gate – ECL – MOS – CMOS.

## **Unit - V**

Designing of OPAMP circuits: OPAMP as Comparator – OPAMP as zero crossing detector – Constant current source – current to voltage converter – thermocouple – temperature monitor – strain gages – force measurement

## **Reference Books:**

1. Electronic Devices and Circuits by G.K.Mithal.
2. Electronic devices : Applications and Integrated circuits by Mathur, Kulshreshtha and Chandha.
3. D. Roy Choudhury and Shail Jain "Linear Integrated Circuits" New age International Ltd, New Delhi 1997.
4. Ramakant A Gayakwad "Op Amps and Linear Integrated Circuits" PHI 1988.

## **109PELT02: ADVANCED MICROPROCESSORS**

### **Unit-I**

Evolution of Microprocessor – Typical Micro Computer Architecture – Memory – memory addressing - Timing diagram -Input/Output .

### **Unit – II**

Intel 8085: Introduction – Register Structure- block diagram – 8085 Addressing modes – Timing Methods- 8085 CPU pins and Associated Signals – instruction set- – Interrupt System – SID and SOD Lines – 8085 Based System Design.

### **Unit – III**

Interfacing Devices: Introduction – Types of Interfacing Devices – Addressing Decoding for I/O – Input/Output Ports – Programmable Interrupt Controller 8259 – Programmable DMA Controller: 8257 Programmable DMA Controller – Analog Input Devices – Analog Output Devices.

### **Unit – IV**

16-bit Microprocessor: Intel 8086: Introduction – Architecture – Addressing Modes – 8086 Input/Output. Motorola MC 68000:Introduction – Registers – Memory Addressing – Instruction Format – Addressing modes – Motorola 68000 I/O

### **Unit - V**

Introduction- register set- Continuous architecture- addressing modes of 80286-

### **Pentium processor**

Introduction- register set - block diagram -addressing modes- pipelining- integer pipelining- floating pipelining.

### **REFERENCE BOOKS:**

1. M.Rafiquzzaman, "Microprocessors Theory and Applications: Intel and Motorola", Prentice Hall India, Revised Edition, 2004.
2. Aditya P. Mathur, "Introduction to Microprocessors", Tata McGraw Hill, Third Edition, 1990.
3. R.S.Gaonkar, "Microprocessor Architecture,programming and Applications with the 8085", 1995.
4. M.Rafiquzzaman, "Microprocessor and MicroComputerBased System Design",UBS, 1995.
5. Advanced microprocessor – Mc graw Hill-Daniel Tabak.

## **109PELT03: DIGITAL AND OPTICAL COMMUNICATION ENGINEERING**

### **UNIT-I: Pulse modulation System:**

Introduction to pulse Modulation – Types – Sampling theorem-Pulse- Width modulation-Generation and demodulation of (PEM)-Pulse position modulation (PPM). Pulse code modulation-Principles-Effects of noise-Companding-Advantages and applications of PCM-Differential PCM-Delta modulation.

### **UNIT-II: Digital modulation techniques:**

Digital carrier systems-Amplitude shift keying-Frequency shift keying-Phase shift keying (PSK)-Binary phase shift keying (BPSK)-Carrier recovery circuits-Differential phase shift keying (DPSK)-Hard and soft decision decoders.

### **UNIT-III: Fiber optic cables:**

Optical fiber cables-Fiber strength and durability-Stability of the fiber transmission characteristics:-Micro bending-Hydrogen absorption-Nuclear radiation exposure-Cable design; fiber buffering-Cable structured and strength members-Cable sheath and water barrier-Example of fiber cables.

### **UNIT-IV: Light sources and light detectors:**

Light sources: LED structure-Planar LED, dome LED, Surface emitter LEDs-Edge emitter LEDs-Super luminescent LEDs-LEDs reliability.

Light detectors: mid-Infrared photodiodes-Phototransistors-Photoconductive detectors.

### **UNIT-V: Fiber optical communication components and systems:**

Components: coupling components for optical fibers-Modulation methods and modulators-Switches-Transmitters-Receivers-Optical amplifiers (Semiconductor Laser Amplifiers). Systems: transmitter and receiver design-Link design-Link codes for optical fiber links.

### **Text and reference books:**

- 1.** Electronic communications systems by George Kennedy III Edition, Tata Mc Graw Hill publishing company Ltd., New Delhi 1998.
- 2.** Electronic communications by Dennis Roddy and John Coolen, IV Edition, Prentice-Hall of India, New Delhi 2004.
- 3.** Optical fiber communications by John M. Senior, II Edition, Prentice-Hall of India, New Delhi 2005.
- 4.** Fiber optic communications by D.C Agarwal, II Edition, S. Chand & Company Ltd., 2004.
- 5.** Principles of communication systems by Taub and schilling II Edition Tata Mc Graw Hill Ltd., New Delhi, 1998.
- 6.** Electronic communication by Taub and Schilling, Bell & Howell Company, 1992.

## **109PELT04: POWER ELECTRONICS &VLSI DESIGN**

### **Unit-I:**

Thyristor: Introduction – natural commutation – forced commutation – self commutation – impulse commutation – resonant pulse commutation – complementary commutation - external pulse commutation.

### **Unit-II:**

Controlled rectifiers:- Introduction – principles of phase controlled converters – single-phase semi converters – single-phase full converters – single-phase dual converters – single-phase series converters.

### **Unit-III:**

Static switches:- Introduction – single phase AC switches – three phase AC switches – three phase reversing switches - AC switches for Bus transfer – solid state relays.

AC voltage controller:- Introduction – Principles of ON - OFF control – principle of phase control – single phase bidirectional controllers with resistive loads and inductive loads– single phase cyclo converters-UPS.

### **Unit-IV: VLSI FABRICATION TECHNIQUES**

An overview of wafer fabrication – Wafer processing – Oxidation – Patterning – Diffusion – Ion implantation – Deposition – Si gate n MOS process – C MOS process – n well – p well Twin tub – Si on insulator – C MOS process Enhancement – Interconnection circuit elements.

### **Unit- V: INTRODUCTION TO VHDL**

Overview of VHDL – Capabilities – Hardware device – Basic terminology – Entity declaration. ARCHITECTURE BODY: Structure style of modeling – Data flow – Style of modeling – Behavioral style of modeling – Mixed style of modeling – Configuration declaration – Package declaration.



## Reference Books:

1. Rashid M.H "Power Electronics: Circuits Devices and Application" 2<sup>nd</sup> Edition, PHI New Delhi, 1996.
2. Timothy J. Maloni: Industrial solid state electronic devices and circuits" 2<sup>nd</sup> Ed., 1986.
3. Neil H.E. Weste Kamaran Eshraghian, "**PRINCIPLES OF CMOS VLSI DESIGN**".
4. J. Bhasker, "VHDL Primer", Low Price Edition, 2001.
5. Charles H. Roth, Jr. "**DIGITAL SYSTEM DESIGN USING VHDL**", Brooks/Cole Thomson Learning PWS Publishing, ISBN-981-240-052-4.

**109PELP01: PRACTICAL –I: ELECTRONICS LAB**  
**(any 15)**

1. Full wave and bridge rectifiers.
2. Clipping and clamping circuits.
3. CE amplifier design.
4. CS FET amplifiers design.
5. *UJT Relaxation oscillator.*
6. Colpitts oscillators.
7. Hartley oscillator.
8. Wien bridge oscillator.
9. Phase shift oscillator.
10. Multivibrators using transistors.
11. Verification of Demorgan's theorem
12. Half and Full Adder,
13. Half and Full subtractor
14. Multiplexer
15. De-multiplexer
16. Encoder and Decoder
17. Shift Register
18. Decade and UP/DOWN counter
19. Analog to Digital Counter
20. Single phase inverter

## 209PELT01: WIRELESS COMMUNICATION

### **Unit-I:** Telecommunication system:

GSM-mobile services – system architecture – radio interfaces – protocols – localization and calling – hand over and security-new date services.

DECT- system architecture – protocol architecture –TETRA-UMTS and IMT2000- UMTS releases and standardization- UMTS architecture –UMTS radio interface – Hand over.

### **Unit –II:**

GEO- LEO-MEO –routing localization- hand over.

Wireless LAN: Infrared and radio transmission-infrastructure and ad-hoc network- IEEE802.11- HIPERLAN – blue tooth.

### **Unit –III:**

Mobile and ad- hoc networks – routing –destination sequence distance vector- dynamic source routing – alternative matrices.

### **Unit – IV:**

Mobile transport layer; Traditional: congestion control – slow start- fast retransmit/ fast recovery- implication of mobility. Classification of TCP improvements : indirect-snooping- mobile TCP-fast transmission /receiving- transmission/time out frequency-selective retransmission

### **Unit-V:**

File system: consistency –coda-little work-ficus – Mio-NFS-recover.

WAP: Architecture-Wireless datagram protocol-transmission layer security- transaction protocol- session protocol- application environment.

### **Reference books**

1. Mobile communication – 2 nd edition –Schiller – Pearson.
2. Wireless communication networks - William Stellys – Low price edition Pearson Edu.
3. Wireless and Mobile Circuits – JACKM HOLTZMAN, DAVIDJ.GOODMAN – Allied publication.

## 209PELT02: ADVANCED NETWORKS

### Unit-I:

**Internet working:** principles of internet working – concatenated virtual circuits – connection less internetworking – tunneling- internetwork routing- fragmentations- firewall.

### Unit-II:

**The www:** the client side – the server side – writing a web page in HTML – locating information on the web.

The internet transport protocol (TCP and UDP): the TCP service model-TCP protocol-TCP segment header-TCP connection management – TCP transmission policy –TCP congestion control – TCP time management – UDP-wireless TCP and UDP.

### Unit-III:

**ISDN:** the integrated digital network- overview of ISDN-transmission structure-user access-ISDN protocols.

**BROAD BAND ISDN:** NTI,-NTI plus and voice communication basis: terminating ISDN connections via NTI- Basis OF NTI and NTI plus- theISDN voice communication primer.

### Unit-IV:

**B-ISDN:** Introduction- the current situation- the idea of the ISDN-B-ISDN- ATM based service and applications- B-ISDN- service and applications initial ATM network services

### Unit-V:

**Desktop video conference:** The down sizing of video conference-desk top video conferencing systems- video conferencing requirements-leading desktop video conferencing systems- elements of video conferencing style.

### Reference books:

1. Andrew S. Tananbaumn - Computer Networks-PHI III Ed-1999.
2. David angel- ISDN for dummies- pub II Ed-1996.

## **209PELT03: C++ & JAVA PROGRAMMING**

### **UNIT-I:**

Basic Concepts of OOP – Structure of C++ - Data types - Variables – Control Structures – Functions – Classes and Objects – Constructors and Destructors.

### **UNIT-II:**

Overloading: Function, Operator – Inheritance – Pointers – Virtual Function – Polymorphism.

### **UNIT-III:**

Streams in C++ - Stream Classes – Formatted and Unformatted data – Manipulators – User Defined Manipulators – File Streams – Opening and Closing a File – File Pointers Manipulation – Template Classes and Functions – Exception Handling: Try, Catch, Throw.

**UNIT-IV:** Introduction to Java – Features of Java – Methods and Classes – Array, Strings and Vector – Inheritance – Packages and Interfaces.

### **UNIT-V:**

Exception Handling – Multithreading – Applets – Graphics Programming.

### **REFERENCE BOOKS:**

1. E. Balagurusamy, "Object Oriented Programming with C++", TMH, Second Edition, 2001.
2. Ravichandran, "Programming with C++", TMH, 1996.
3. Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley, 2004.
4. Patrick Naughton and Hilbert Schildt, "The Complete Reference Java 2", TMH, 2003.
4. E.Balagurusamy, "Programming with Java A Primer", TMH, Second Edition, 1999.

## **209PELP01: MICROPROCESSOR AND COMMUNICATION LAB**

**(Any 15 )**

### **Using 8085:**

1. 8- bit addition, subtraction
2. 8 -bit Multiplication and division
3. 16- bit addition, subtraction
4. 16 -bit Multiplication and division
5. Stepper motor interfacing
6. ADC
7. DAC
8. Traffic light controller

### **Communication:**

1. AM modulation
2. FM modulation and detection
3. Automatic gain control
4. Voltage gain control
5. Pulse amplitude modulation
6. Pulse width modulation
7. Pulse position modulation
8. Study of PLL characteristics
9. Digital phase detector
10. Pulse code modulation
11. Study of cable TV system
12. Microwave experiments – Klystron

## **209PELP02: Project viva-voce**

### **PROJECT (100 Marks)**

#### **a. Topic**

The topic of the Project shall be assigned to the candidate before the end of first year and a copy of the same should be submitted to the University for approval.

#### **b. Advisory committee**

Each guide shall have a maximum of five students in science and maximum of seven for all Arts subjects.

There will be an advisory committee consisting of the guide as chairman and one member from the same department or allied departments of the college and a third member should be from other college preferably from Aided / Government colleges in the case of self financing college and vice – versa.

#### **c. No. of Copies/ Distribution of Project**

The students should prepare three copies of Project and submit the same for the evaluation by examiners. After evaluation one copy is to be retained in the college library and one copy is to be submitted to the University (Registrar) and one copy can be held by the student.

#### **d. Format to be followed**

The formats / certificate for Project to be submitted by the students are given below:

#### **Format for the preparation of project work**

- a. Title page
- b. Bonafide certificate
- c. Acknowledgement
- d. Table of content





## **Format of the certificate**

### **CERTIFICATE**

This to certify that the Project entitled.....  
submitted in part fulfillment of the requirement of the Degree of Master of Science / Master of Arts in ..... to the St. Peter's University, Distance Education, Chennai. is a record of bonafide research work carried out by ..... under my supervision and guidance and that no part of the Project has been submitted for the award of any degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journals or magazines.

Date:

Place:

Chairman, Advisory Committee,

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Approved by

Chairman:

Members:

1.

2.

## **External Examiner**

### **Guidelines for approval of PG guides for guiding students in their research for submitting Project.**

#### **1. M.Sc. (Part fulfillment ) Guide**

- i. The person seeking for recognition as guide should have.
- ii. M.Sc degree with first class / second class
- iii. Should have 3 years of active teaching / research experience.

**2.** They should have published atleast one research paper in a National journal authored solely or jointly. Procedure for submitting application for approval as guides

- a. The University will on request give prescribed application form.
- b. The filled in applications should be submitted before the close of said date by the University.
- c. such applications should be routed through the Principal of their respective institutions with specific recommendations.
- e. All relevant proofs should be submitted along with the applications.

#### **3. Approval**

The committee constituted for the purpose will scrutinize the applications and recommend for approval / rejection.

Orders will then be passed by the authority of the university and communicated to each member individually through the Principal.