

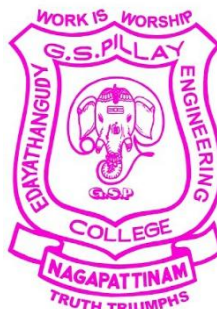
# E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA

NAGAPATTINAM – 611 002



## B.E ELECTRICAL AND ELECTRONICS ENGINEERING

Second Year – Third Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
<b>Theory Course</b>								
1901MA303	Engineering Mathematics III	3	2	0	4	40	60	100
1902EE301	Analog Electronics	3	0	0	3	40	60	100
1902EE302	Digital Electronics	3	0	0	3	40	60	100
1902EE303	DC Machines and Transformers	2	2	0	3	40	60	100
1902CS307	Object Oriented Programming	3	0	0	3	40	60	100
<b>Laboratory Course</b>								
1902EE351	Analog Electronics Laboratory	0	0	3	1.5	50	50	100
1902EE352	DC Machines and Transformers Laboratory	0	0	3	1.5	50	50	100
1902CS355	Object Oriented Programming Laboratory	0	0	2	1	50	50	100
1904GE351	Soft Skills – Soft Skill	1	0	1	1.5	100	0	100
<b>Audit Course</b>								
1901MCX02	Indian Constitution	2	0	0	0	0	0	0

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

<b>1901MA303</b>	<b>Engineering Mathematics III (Complex Variables, Vector Calculus and Transforms)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>

**MODULE I ANALYTIC FUNCTIONS** **12 Hours**

Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping:  $w = z+k$ ,  $kz$ ,  $1/z$ , and bilinear transformation.

**MODULE II VECTOR CALCULUS** **12 Hours**

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration: Greens theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Applications of the above theorems to find surface area of a closed region and volume of cube and parallel piped.

**MODULE III COMPLEX INTEGRATION** **12 Hours**

Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Taylor’s and Laurent’s series expansions – Singular points – Residues – Cauchy’s residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

**MODULE IV FOURIER TRANSFORMS** **12 Hours**

Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval’s identity

**MODULE V TRANSFORMS** **12 Hours**

Z- transforms - Elementary properties – Inverse Z - transform (using partial fraction and residues) – Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transform

**TOTAL: 60 HOURS**

**REFERENCES:**

1. Bali N. P and Manish Goyal, “A Text book of Engineering Mathematics”, Eighth Edition, Laxmi Publications Pvt Ltd.,(2011).
2. Grewal. B.S, “Higher Engineering Mathematics”, 41<sup>st</sup> Edition, Khanna Publications, Delhi, (2011).
3. Dass, H.K., and Er. Rajnish Verma,” Higher Engineering Mathematics”, S. Chand Private Ltd., (2011)
4. Glyn James, “Advanced Modern Engineering Mathematics”, 3<sup>rd</sup> Edition, Pearson Education, (2012).
5. Peter V. O’Neil,” Advanced Engineering Mathematics”, 7th Edition, Cengage learning, (2012).
6. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi, (2008).

1902EE301

**ANALOG ELECTRONICS**

L	T	P	C
3	0	0	3

**MODULE I DIODES**

**9 Hours**

**PN Junction Diode:** Structure, Operation and V-I characteristics; Capacitance effect – Diffusion capacitance and transition capacitance; Diode model; Applications–Clippers and clampers.

**Zener Diode:** V-I Characteristics, Breakdown mechanism; Application – Voltage regulator.

**Special Function Diodes:** Structure and operation of LED, Laser diode, Tunnel diode, Schottky diode and Photodiode.

**MODULE II BIPOLAR JUNCTION TRANSISTOR AND CIRCUITS**

**9 Hours**

**BJT:** Structure, operation, biasing circuits, V-I characteristics in common base, common emitter and common collector configurations; DC and AC load line analysis- Determination of Q point; Secondary breakdown; Small signal model; Analysis and comparison of CB, CE and CC amplifiers; Low and high frequency response of an amplifier; Darlington amplifier.

**MODULE III FIELD EFFECT TRANSISTOR CIRCUITS**

**9 Hours**

**JFET:** Structure, operation, n channel and p channel, V-I characteristics and biasing circuits of JFET.

**MOSFET:** Structure and operation of D-MOSFET & E-MOSFET, V-I characteristics, Biasing circuits, small signal model; Analysis of common source and common drain amplifiers; high frequency equivalent circuit; Comparison of devices.

**MODULE IV DIFFERENTIAL AND POWER AMPLIFIERS**

**9 Hours**

**Differential Amplifier:** Common mode and difference mode analysis of BJT based differential amplifier.

**Single Tuned Amplifiers:** Gain and frequency response of single tuned BJT and FET amplifiers; Neutralization methods.

**Power Amplifiers:** Class A, class B, class C and class AB Amplifiers (Qualitative analysis).

**MODULE V FEEDBACK AMPLIFIERS AND OSCILLATORS**

**9 Hours**

**Negative Feedback:** Voltage series, current series, current shunt and voltage shunt amplifiers – Input impedance, output impedance, current gain, voltage gain, overall current gain and overall voltage gain.

**Positive Feedback:** Barkhausen criterion; RC oscillators – RC phase shift and Wien bridge oscillators; LC oscillators – Hartley, Colpitts and Clapp; Crystal oscillators – Miller and Pierce crystal oscillators.

**TOTAL: 45 HOURS**

**REFERENCES:**

1. Milman, Halkias and Satyabrata Jit, Electronic Devices and Circuits, McGraw Hill Education (India) Private Ltd., 4<sup>th</sup> Edition, 2015.
2. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, PHI Ltd., 11<sup>th</sup> Edition, 2015.
3. David A. Bell, Electronic Devices and Circuits, Oxford University Press, 5<sup>th</sup> Edition, 2008.
4. Thomas L. Floyd, Electronic Devices, An Imprint of Mc Millan publishing company, 10<sup>th</sup> Edition, 2017.
5. Prof.A.N.Chandorkar, IIT Bombay online lecture series on Analog Electronics  
<http://nptel.ac.in/courses/117101106/>
6. Albert Malvino and David Bates, Electronic Principles, 8th Edition,
7. Prof.S.Karmalkar, IIT Madras, online lecture series on Solid State Devices  
<http://nptel.ac.in/courses/117106091/>
8. [https://onlinecourses.nptel.ac.in/noc18\\_ee32/preview](https://onlinecourses.nptel.ac.in/noc18_ee32/preview).

1902EE302

**DIGITAL ELECTRONICS**

L	T	P	C
3	0	0	3

**MODULE I                      NUMBER SYSTEM AND BOOLEAN ALGEBRA                      9 Hours**

Review of number system, Binary codes –BCD, Gray code, Excess 3 code; Error detection and correction codes – Parity, Hamming codes.

Boolean postulates- laws, rules & theorems; Standard forms of Boolean expressions, conversions; Simplification using K-maps-3, 4 and 5 variables.

**MODULE II                      COMBINATIONAL LOGIC CIRCUITS                      9 Hours**

Design of adders, subtractors, comparators, code converters, encoders, decoders, multiplexers and de-multiplexers. Function realization using multiplexers; Booth multiplier and Array Multiplier; Simulation of simple logic circuits.

**MODULE III                      SYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS                      9 Hours**

Latches-operation of SR and gated SR latch; Flip flops – Method of edge triggering, SR, JK, Master Slave JK, D, and T flip flops; Important signals of FF.

Design of Synchronous sequential circuits- Model Selection, State transition diagram, State synthesis table, Design equations, State reduction technique and Implementation; Binary counters-4 bit UP, DOWN and UP/DOWN counters; BCD counters, Ring counters, shift registers, Johnson counters.

**MODULE IV                      ASYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS                      9 Hours**

Synchronous Vs Asynchronous sequential circuits; Design of asynchronous sequential circuits-Design steps, State transition diagram, State table, FF transition table, K-map based Primitive table, State reduction techniques, state assignment and design equations; Races and hazards.

**MODULE V                      MEMORY DEVICES, PROGRAMMABLE LOGIC DEVICES AND LOGIC FAMILIES                      9 Hours**

Memories: ROM, PROM, EPROM; Programmable Logic Devices – PLA, PAL, PLD. Logic families: TTL, ECL, CMOS; Case study on four bit accumulator.

**TOTAL: 45 HOURS**

**REFERENCES:**

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 4th edition, 2013.
2. A.Anandkumar, “Fundamentals of digital circuits”, 3<sup>rd</sup> Edition, PHI Learnings Pvt. Ltd, 2014.
3. Malvino and Leach, Digital Principles and Applications, Tata McGraw Hill, New Delhi, 7th edition, 2011.
4. Floyd, Digital Fundamentals, Pearson Education, 10th edition, 2011.
5. John F.Wakerly, Digital Design Principles and Practice, Pearson Education, 4th edition, 2008.
6. <http://nptel.ac.in/courses/117106086/>

**1902EE303**

**DC MACHINES AND TRANSFORMERS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**MODULE I DC GENERATOR**

**9 Hours**

Rekindling of magnetic circuit fundamentals; DC generator- Construction, Materials for different parts, development of lap and wave winding, EMF equation, excitation types, Commutation, Armature reaction, Compensating winding, and characteristics; Simulation study on dc separately excited dc generator.

**MODULE II DC MOTOR**

**9 Hours**

Principle of operation, Classification, Torque equation, Characteristics, Starters; Speed Control and Braking methods; Simulation of dc motors.

**MODULE III TESTING AND APPLICATIONS OF DC MACHINES**

**9 Hours**

Losses and Efficiency calculations; Testing- Swinburne's test, Brake test, Hopkinson test; Industrial applications of DC generators & DC motors; Energy saving options.

**MODULE IV TRANSFORMER**

**9 Hours**

Single phase transformer: Construction, Principle of operation, Classification, Ideal transformer, Equivalent circuit, Phasor diagrams, Voltage regulation, Characteristic curves, Conditions for maximum regulation and power factor; Parallel operation of transformers.

Three phase transformer: Parts of transformer, Cooling, Connections, Tertiary winding; Inrush current; Per unit representation.

**MODULE V PERFORMANCE EVALUATION AND APPLICATIONS OF TRANSFORMER**

**9 Hours**

Performance evaluation of transformer: Open circuit and Short circuit test, Polarity test, Load test, Sumpner's test; Design overview of transformer.

Applications of transformer: Auto transformer, Power transformer, Distribution transformer- Calculation of All day efficiency, Potential transformer, Current transformer and Isolation transformers.

**TOTAL: 45 HOURS**

**REFERENCES:**

1. D. P. Kothari and I. J. Nagrath, Electric Machines, Tata McGraw Hill Publishing Company Ltd, 2010.
2. Edward Hughes, Electrical and Electronic Technology, 12<sup>th</sup> edition, Pearson, 2016.
3. P. S. Bimbhra, Electrical Machinery, Khanna Publishers, 7th edition, 2011.
4. B. L. Theraja and A. K. Theraja, —Text Book of Electrical Technology: AC & DC Machines (Volume- 2), S.Chand & Company Ltd., New Delhi, 2008.
5. M.N. Bandyopadhyay, Electrical Machines Theory and practice, PHI Learning Pvt. Ltd, New Delhi 2007.
6. Electrical Machines-I Nptel lecture video by Dr. D.Kastha, IIT Kharagpur.

<b>1902CS307</b>	<b>OBJECT ORIENTED PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**MODULE I INTRODUCTION TO C++ 9 Hours**

Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading – friend functions – const and volatile functions – static members – Objects – pointers and objects – constant objects – nested classes – local classes

**MODULE II CONSTRUCTORS 9 Hours**

Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors – operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor

**MODULE III INTRODUCTION TO JAVA 9 Hours**

Overview of java-data types-variables-operators-arrays-control statements-object and classes- methods-accessspecifiers-static members-finalize methods-constructors-exception handling

**MODULE IV INHERITANCE AND POLYMORPHISM 9 Hours**

Inheritance-super keyword-types of inheritance – polymorphism- method overriding-method overloading- abstract class-inner class-interfaces-reflections

**MODULE V PYTHON PROGRAMMING 9 Hours**

Data types – variables – operators – control flow – class/objects – Inheritance – functions

**TOTAL: 45 HOURS**

**REFERENCES:**

1. B. Trivedi, “Programming with ANSI C++”, Oxford University Press, 2018.
- 2.H.M.Deitel, P.J.Deitel, “Java how to program”, Fifth edition, Prentice Hall of India private limited,2017.
3. Ira Pohl, “Object-Oriented Programming Using C++”, Pearson Education Asia, 2017.
- 4.K.R.Venugopal, RajkumarBuyya, T.Ravishankar, “Mastering C++”, TMH, 2015.
5. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist“, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016 (<http://greenteapress.com/wp/thinkpython/>)
6. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2018

**1902EE351**

**ANALOG ELECTRONICS LABORATORY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**LIST OF EXPERIMENTS**

1. Characteristics of PN junction diode and Zener diode.
2. Design of Clipper and Clamper circuits.
3. Characteristics of CE and CB configurations.
4. Characteristics of JFET / MOSFET.
5. Design and verify the frequency response of single stage transistor amplifier.
6. Design and verify the frequency response of RC phase shift oscillator.
7. Frequency response of two stage RC coupled amplifier.
8. Verify the V-I characteristics of photo diode and photo transistor.
9. Design and test a voltage regulator circuit using zener diode.
10. Design a transistor based battery charging control circuit.
11. Design of Hartley Oscillator
12. Design of Colpitts Oscillator

**TOTAL: 36 HOURS**

**ADDITIONAL EXPERIMENTS:**

1. Design of transistor based differential amplifier.
2. Real time applications using logic gates/Flip-flops.

**REFERENCES:**

1. Mr.K. Krishnaram, —Electronic Devices and Circuits – Lab Manuall 2018.
2. Milman, Halkias and Satyabrata Jit, —Electronic Devices and Circuits| 4th Edition, Mc Graw Hill Education (India) Private Ltd, 2015.
3. Integrated circuits: Solution manual: Analog digital circuits and systems manual by Jacob Millman.

1902EE352

**DC MACHINES AND TRANSFORMERS LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**LIST OF EXPERIMENTS:**

1. Swinburne's test and load test on DC shunt motor.
2. Parallel operation of single phase transformers.
3. Load test on DC series motor.
4. Load test on DC compound motor.
5. Speed control of DC shunt motor (Field control & armature control method).
6. Open circuit and load characteristics of DC shunt generator.
7. Open circuit and short circuit test on single phase transformer.
8. Open circuit and short circuit test on three phase transformer.
9. Load test on single phase transformer.
10. Load test on three phase transformer.

**TOTAL : 36 HOURS**

**ADDITIONAL EXPERIMENTS :**

1. Sumpner's test on single phase transformer.

**REFERENCES:**

1. B.A.NaveenAntony—ElectricalMachinerylaboratory-1Manual,2018.
2. D.P.Kothari & B.S.Umre, Laboratory Manual for Electrical Machines, I.K.International publishing house Pvt. Ltd., 2013.
3. B.L.Theraja & K.Theraja, Text BookofElectricalTechnology: AC&DCMachines–Volume-2, S.Chand & Company Ltd., NewDelhi, 2008.



<b>1902CS355</b>	<b>OBJECT ORIENTED PROGRAMMING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**LIST OF EXPERIMENTS:**

1. Write a C++ program using Static Data Members
2. Write a C++ program to implement the Multiple constructor in a class
3. Write a C++ program to implement Operator overloading for Unary and binary operator
4. Write a C++ program to implement Constructor in derived classes
5. Write a Java program to implement Control Statements
6. Write a Java program to implement Multi-threaded programming
7. Write a Java program to implement Multiple Inheritance
8. Write a Java program to implement Polymorphism
  
9. Write a program to implement control flow in Python
10. Write a python programs using functions.

**Total: 45 Hours**

**ADDITIONAL EXPERIMENTS:**

1. Program to overload unary and binary operator as Nonmember function.
2. Write a Java program to develop simple application(project) using OOP's concept.

**REFERENCES:**

1. <https://lecturenotes.in/practicals/19363-lab-manuals-for-object-oriented-programming>
2. <http://studentsfocus.com/cs6461-object-oriented-programming-lab-manual>
3. <http://bietbvrn.ac.in/public/testimonia>
4. <http://www.srmuniv.ac.in/sites/default/files>
5. <https://rcetcsevani.files.wordpress.com/2017/11/ppp-lab-manual.pdf>

**1904GE351**

**LIFE SKILLS: SOFT SKILL**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**MODULE I INTRODUCTION TO SOFT SKILLS**

**6 Hours**

Soft Skills an Overview - Basics of Communication – Body Language – Positive attitude –Improving Perception and forming values – Communicating with others.

**MODULE II TEAM VS TRUST**

**6 Hours**

Interpersonal skills – Understanding others – Art of Listening - Group Dynamics –Essential of an effective team - Individual and group presentations - Group interactions – Improved work Relationship .

**MODULE III SELLING ONESELF**

**6 Hours**

How to brand oneself – social media – job hunting – Resume writing – Group Discussion – Mock G.D - .Interview skills – Mock Interview

**MODULE IV CORPORATE ETIQUETTE**

**6 Hours**

What is Etiquette – Key Factors – Greetings – Meeting etiquette – Telephone etiquette – email etiquette – Dining etiquette – Dressing etiquette .

**MODULE V LEARNING BY PRACTICE**

**6 Hours**

My family-Myself-Meeting people-Making Contacts.-A city-Getting about town-Our flat-Home life-Travelling - Going abroad- Going through Customs-At a hotel-Shopping- Eating out- Making a phone call- A modern office-Discussing business.

**TOTAL: 45 HOURS**

**REFERENCES:**

- 1 Dr.k.Alex, “soft skills “Third Edition, S.Chand & Publishing Pvt Limited, 2009
2. Aruna koneru, ‘Professional Communication’ Second Edition, Tata McGraw-Hill Education, 2008
3. D.K.Sarma,’You & Your Career ‘First Edition Wheeler Publishing & Co Ltd, 1999
4. Shiv Khera ‘You Can Win’ Third Edition Mac Millan Publisher India Pvt Limited, 2005