

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 (CSE, EEE, MECH, CIVIL, ECE, IT)
NAGAPATTINAM – 611 002



B.Tech. – Computer Science and Business System

Full Time Curriculum and Syllabus

First Year – Second Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1901MA205	Linear Algebra	3	1	0	4	40	60	100
1901MA206	Statistical Modeling	3	1	0	4	40	60	100
1901GE202	Data Structures and Algorithms	2	1	2	4	50	50	100
1901GE203	Principles of Electronics	2	0	2	3	50	50	100
1901HS201	Fundamentals of Economics	2	0	0	2	40	60	100
1901EN201	Business Communication and Value Science - II	1	0	2	2	100	0	100
Total		13	3	6	19	320	280	600

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

1901MA205	LINEAR ALGEBRA	L	T	P	C
		3	1	0	4
MODULE I	MATRICES				09 Hours
Determinants - Properties of determinants - Matrices - Operations in matrices -Hermitian and Unitary matrices - Rank of a matrix - Solution of system of Linear equations: Cramer’s rule - Matrix Inversion method - Rank method.					
MODULE II	EIGEN VALUES AND EIGEN VECTORS				09 Hours
Eigen Values and Eigen Vectors of a real matrix - Properties of Eigen Values- Cayley - Hamilton Theorem.					
MODULE III	MATRIX DECOMPOSITION				09 Hours
Positive definite matrix -Gauss Elimination method - Gauss Jordan method - LU decomposition -Singular value decomposition.					
MODULE IV	VECTOR SPACES				09 Hours
Vector spaces - Subspaces - Linear combinations and linear system of equations - Linear independence and linear dependence - Linear Transformations - Basis and dimensions.					
MODULE V	INNER PRODUCT SPACES				09 Hours
Inner products - Norms - Orthogonality of vectors - Projections - Gram-Schmidt orthogonalization - QR decomposition.					
					TOTAL: 45 HOURS

REFERENCES:

1. Kreyszig Erwin, Advanced Engineering Mathematics, 7th Edition, John Wiley, 1993.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication, 2017
3. Peter V. O'Neil, Advanced Engineering Mathematics, Seventh Edition, Thomson Learning, 2011
4. Michael. D. Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson, 2002.
5. Gilbert Strang, Introduction to linear algebra, Fifth Edition, ANE Books, 2016.
6. <https://machinelearningmastery.com/introduction-matrices-machine-learning/>

1901MA206	STATISTICAL MODELING	L	T	P	C
		3	1	0	4

MODULES I LINEAR STATISTICAL MODELS 9 Hours

Multiple Correlation & Multiple Regression-Analysis of variance: Completely randomized design - Randomized block design.

MODULES II ESTIMATION 9 Hours

Point estimation - criteria for good estimates (Un-biasedness & Consistency) - Methods of estimation including maximum likelihood estimation. Sufficient Statistic: Concept & examples - Complete sufficiency - Application in estimation.

MODULES III NON-PARAMETRIC INFERENCE 9 Hours

Comparison with parametric inference - Use of order statistics - Sign test - Wilcoxon signed rank test - Mann-Whitney test - Run test - Kolmogorov-Smirnov test - Spearman's and Kendall's test - Tolerance region.

MODULES IV TIME SERIES ANALYSIS 9 Hours

Basics of Time Series Analysis - Forecasting - Stationary - ARIMA Models: Identification - Estimation – Forecasting.

MODULES V R PROGRAMMING 9 Hours

Introduction to R - Functions - Control flow and Loops - Working with Vectors and Matrices - Reading in Data - Writing Data - Working with Data - Manipulating Data - Simulation - Linear model - Data Frame - Graphics in R.

TOTAL: 45 HOURS

REFERENCES:

1. R. Miller, J.E. Freund and R. Johnson, Probability and Statistics for Engineers, Fourth Edition, Pearson, 2015.
2. A. Goon, M. Gupta and B.Dasgupta, Fundamentals of Statistics (Vol. II), The Word Press, 1933.
3. A. Goon, M. Gupta and B.Dasgupta, Fundamentals of Statistics (Vol. I), The Word Press, 1933
4. D.C. Montgomery and E.Peck , Introduction to Linear Regression Analysis, Third Edition, Wiley, 2010.
5. Garrett Grolemond, Hands-on Programming with R, Shroff Publishers & Distributors Pvt Ltd, 2018.

1901GE202	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		2	1	2	4

MODULES I BASIC TERMINOLOGIES 9 Hours

Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

MODULES II LINEAR DATA STRUCTURE 9 Hours

Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures

MODULES III NON-LINEAR DATA STRUCTURE 9 Hours

Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Graphs (Directed, Undirected), Various Representations, Operations (search and traversal algorithms and complexity analysis) & Applications of Non-linear Data Structures.

MODULES IV SEARCHING AND SORTING ON VARIOUS DATA STRUCTURES 9 Hours

Sequential Search, Binary Search, Breadth First Search, Depth First Search, Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heap Sort, Introduction to Hashing

MODULES V FILES 9 Hours

Definition, File Organization: Sequential file Organization, Direct file Organization, Indexed Sequential, Hashed and accessing schemes.

TOTAL: 45 HOURS

LIST OF EXPERIMENTS:

EXPERIMENT 1 Towers of Hanoi using user defined stacks.	5 Hours
EXPERIMENT 2 Reading, writing, and addition of polynomials.	5 Hours
EXPERIMENT 3 Line editors with line count, word count showing on the screen	5 Hours
EXPERIMENT 4 Trees with all operations	5 Hours
EXPERIMENT 5 All graph algorithms.	5 Hours
EXPERIMENT 6 Saving / retrieving non-linear data structure in/from a file	5 Hours

TOTAL: 30 HOURS

REFERENCES:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, Silicon Press, 2009.
2. Richard F. Gilberg, and Behrouz A. Forouzan, Data Structures - A Pseudocode Approach with C, Thomson 2011.
3. Y.Langsam, M.J.Augenstein and A.M.Tenenbaum, Data Structures using C, PHI, 2007.
4. Aho, J.E.Hopcroft and J.D.Ullman, Data Structures and Algorithms, Pearson education, Asia, 2010.
5. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31st ed.
6. Richard F. Gilberg, and Behrouz A. Forouzan, Data Structures - A Pseudocode Approach with C, Thomson 2011.
7. Y.Langsam, M.J.Augenstein and A.M.Tenenbaum, Data Structures using C, PHI, 2007.
8. Aho, J.E.Hopcroft and J.D.Ullman, Data Structures and Algorithms, Pearson education, Asia, 2010.
9. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31st ed.

1901GE203

PRINCIPLES OF ELECTRONICS

L	T	P	C
2	0	2	3

MODULES I ELECTRIC CIRCUITS

9 Hours

Definition of Voltage, Current, Power & Energy, Ohms law, Kirchoffs Law & its applications simple problems, Simple mesh and Node problems, Generation of Alternative EMF, Average value of current and voltage, Form Factor, Peak Factor.

MODULES II SEMICONDUCTOR DIODE AND ITS APPLICATION

9 Hours

Conductor, Semiconductors & Insulators, Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers. Characteristics of PN Junction Diode and Zener diode, Rectifier Circuits Half wave, Full wave circuits, Efficiency, PIV, Ripple factor and AC and DC current and voltage in rectifier.

MODULES III BIPOLAR JUNCTION AND FIELD EFFECT TRANSISTOR

9 Hours

Structure and working of bipolar junction transistor, CB, CC, CE configurations, relation between alpha and beta, Concept of transistor as an amplifier and transistor as a switch, Field Effect Transistors: Construction and characteristics of JFET-parameters of JFET-MOSFET – Depletion and enhancement modes Construction and characteristics.

MODULES IV FEED BACK AMPLIFIER, AND OPERATIONAL AMPLIFIERS

9 Hours

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors, Introduction to integrated circuits: operational amplifier and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Voltage follower, Comparator, Integrator, Differentiator.

MODULES V DIGITAL ELECTRONICS FUNDAMENTALS

9 Hours

Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.

TOTAL: 45 HOURS

LIST OF EXPERIMENTS:

EXPERIMENT 1: To plot V-I characteristics of PN junction diode.	3 Hours
EXPERIMENT 2: To plot regulation characteristics of half wave rectifier	3 Hours
EXPERIMENT 3: To plot regulation characteristics of Full wave rectifier	3 Hours
EXPERIMENT 4: To plot input-output characteristics of CE configuration of BJT.	3 Hours
EXPERIMENT 5: To study Biasing techniques of BJT- to find stability factor of self-bias, collector to base bias, fixed bias circuits.	3 Hours
EXPERIMENT 6: To plot frequency response of single stage FET amplifier (CS/CD configuration) and find its bandwidth.	3 Hours
EXPERIMENT 7: To study Colpitts Oscillator.	3 Hours
EXPERIMENT 8: Study of OP-AMP circuits: Inverting and Non-inverting Amplifier.	3 Hours
EXPERIMENT 9: Study of basic logic gates and De-Morgan's Theorem.	3 Hours
EXPERIMENT 10: Study of half adder and full adder	3 Hours

TOTAL: 30 HOURS

REFERENCES:

1. William Hayt, J.V. Jack, E. Kemmerly and Steven M Durbin, Engineering Circuits Analysis, Tata McGraw-Hill, 2013
2. L. Robert Boylestaid, Louis Nashelsky, Electronic Devices and Circuit Theory Pearson Education, 2012.
3. J. Millman, C. Halkias & Satyabratajit, Electronic Devices and Circuits, Tata McGraw- Hill, 2010
4. Ramakant A. Gayakwad, OP-AMP and Linear IC's, Prentice Hall of India, 2002.
5. Thomas L. Floyd, Digital Fundamentals, Prentice Hall, 11th Edition, 2015.

1901HS201	FUNDAMENTALS OF ECONOMICS	L	T	P	C
		2	0	0	2

MODULES I MICRO ECONOMICS 6 Hours

Principles of Demand and Supply - Supply Curves of Firms - Elasticity of Supply; Demand Curves of Households - Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve);

MODULES II WELFARE ANALYSIS 6 Hours

Consumers and Producers Surplus- Price Ceilings and Price Floors; Consumer Behaviour - Axioms of Choice- Budget Constraints and Indifference Curves; Consumers Equilibrium Effects of a Price Change, Income and Substitution Effects Derivation of a Demand Curve

MODULES III APPLICATIONS 6 Hours

Tax and Subsidies - Inter temporal Consumption -Suppliers- Income Effect; Theory of Production - Production Function and Isoquants - Cost Minimization; Cost Curves - Total, Average and Marginal Costs - Long Run and Short Run Costs; Equilibrium of a Firm Under Perfect Competition; Monopoly and Monopolistic Competition

MODULES IV MACRO ECONOMICS 6 Hours

National Income and its Components - GNP, NNP, GDP, NDP Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Government Sector - Taxes and Subsidies; External Sector - Exports and Imports; Money -Definitions; Demand for Money Transaction and Speculative Demand; Supply of Money - Banks Credit Creation Multiplier; Integrating Money and Commodity Markets - IS, LM Model

MODULES V BUSINESS CYCLES AND STABILIZATION 6 Hours

Monetary and Fiscal Policy - Central Bank and the Government; the Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment.

MODULES VI BUSINESS CYCLES AND STABILIZATION 6 Hours

Monetary and Fiscal Policy - Central Bank and the Government; the Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment.

TOTAL: 36 HOURS

REFERENCES:

1. Pindyck, Robert S and Daniel L. Rubinfeld , Microeconomics, Eighth Edition, 2013 .
2. Dornbusch, Fischer and Startz, Macroeconomics, Tenth Edition, Tata Mcgraw Hill, 2012.
3. Paul Anthony Samuelson, William D. Nordhaus, Economics, Nineteenth Edition, McGraw-Hill Education, 2010.
4. Hal R, Varia, Intermediate Microeconomics: A Modern Approach, Eighth Edition Affiliated East- West Press, 2006
5. N. Gregory Mankiw, Principles of Macroeconomics, Seventh Edition, Cengage Learning, 2018.

1901EN201 BUSINESS COMMUNICATION AND VALUE SCIENCE - II

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ speaking / Reading/ Writing) skills needed either for recruitment or further studies abroad for which they attempt international exams like TOEFL, IELTS and GRE. It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives. It aims to prepare students for careers requiring global business awareness and to develop skills required to work in internationally operating companies and organizations.

Course Objectives

- ✚ Understand what life skills are and their importance in leading a happy and well-adjusted life.
- ✚ Motivate students to look within and create a better version of self.
- ✚ Introduce them to key concepts of values, life skills and business communication.

COURSE CONTENTS

- ✚ Overview of the course with immersion activity.
- ✚ Overview of biz communication.
- ✚ Self-awareness, confidence and communication.
- ✚ Essentials of Business communication.
- ✚ Application of communication skills.
- ✚ Application of Life Skills.
- ✚ Assignment.

Module I:

6 hrs

Essential Grammar – II : Parts of Speech – Listen to an audio clip and note down the different parts of speech followed by discussion.

Tenses-Applications of tenses in Functional Grammar (Take a quiz and then discuss) Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong sentence structure (e.g. Zindagi Na Milegi Dobara where the characters use ‘the’ before every

Module II:

6 hrs

Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary – Read Economic Times, Reader’s Digest, National Geographic and take part in a GD, using the words you learnt/liked from the articles.

Group discussion using words learnt- Toastmaster style Table Topics speech with evaluation

Module III :

7 hrs

Written Communication:

Summary writing- story writing -Email writing: Formal and informal emails, activity- Build your CV – start writing your comprehensive CV including every achievement in your life, no format, no page limit- Create a podcast on a topic that will interest college students

Module IV:

7 hrs

Life Skills : Stress management, working with rhythm and balance, colours, and teamwork- Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what can you relate to?- Introduction to life skills
What are the critical life skills- Multiple Intelligences Embracing diversity – Activity on appreciation of diversity- Community service – work with an NGO and make a presentation- Create a musical using the learning from unit

Module V:

6 hrs

Soft Skills:

Join a trek – Values to be learned: Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation

TOTAL: 32 Hours

Course Outcomes

After completion of the course, the student will be able to

- Recognize the need for life skills and values: (U)
- Recognize own strengths and opportunities: (U)
- Apply the life skills to different situations: (AP)
- Understand the basic tenets of communication: (U)
- Apply the basic communication practices in different types of communication: (AP)

Text Book(s)

1. There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

References

1. English vocabulary in use – Alan Mc’Carthy and O’dell.
2. APAART: Speak Well 1 (English language and communication)
3. APAART: Speak Well 2 (Soft Skills)
4. Business Communication – Dr. Saroj Hiremath

Web References

1. Train your mind to perform under pressure- Simon sinek
<https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture-your-flag/>
2. Brilliant way one CEO rallied his team in the middle of layoffs
<https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html>
3. Will Smith's Top Ten rules for success
<https://www.youtube.com/watch?v=bBsT9omTeh0>

Online Resources

1. <https://www.coursera.org/learn/learning-how-to-learn>
2. <https://www.coursera.org/specializations/effective-business-communication>