RAGHU ENGINEERING COLLEGE (Autonomous)

(Approved by AICTE, New Delhi & Permanently Affiliated to JNTUGV, Vizianagaram)
NBA and NAAC 'A+' grade accredited Institute.
Dakamarri, Bheemili Mandal, Visakhapatnam – 531162, A.P.
Phone: 08922-248001 / 221122/9963981111, www.raghuenggcollege.com

INSTITUTE VISION

Envisioning to be a world class technical institution by synergizing quality education with ethical values.

INSTITUTE MISSION

- To encourage training and research in cutting-edge technologies.
- To develop and strengthen strategic links with the industry.
- To kindle the zeal among the students and promote their quest for academic excellence.
- To encourage extra-curricular activities along with good communication skills.

QUALITY POLICY

RAGHU Engineering College underscores ethical values along with innovative teaching through an interactive, activity-based pedagogy; establishes the best of infrastructural facilities, inculcates engineering temper among the students through the use of the latest Information and Communication Technologies, and strives for an efficient, responsive and transparent administration in all areas.

Department of Electronics and Communication Engineering

VISION

To grow into a premier engineering department with excellence in teaching, research, and innovation in the field of electronics and communication engineering at par with the global industrial standards catering to the needs of the stakeholders while keeping up with the advancing technology.

MISSION

M1: To provide excellence in education, research and public services.

M2: To provide a creative environment through structured teaching and learning process.

M3: To impart employability-focused education while imbibing the spirit of entrepreneurship.

M4: To inculcate self-learning attitude, management skills and professional ethics.

PROGRAMME EDUCTIONAL OBJECTIVES(PEOs)

- **PEO 1: Domain Knowledge: -** To have the knowledge and technical skills required to remain productive.

- **PEO 2: Communication Skills & Employability: -** To apply technical knowledge and skills as electronics and communication engineers to provide practical solutions in industrial and governmental organizations.

- **PEO 3: Life Long Learning & Social Concern: -** To achieve success with awareness of entrepreneurship skills and have the ability for lifelong learning by pursuing professional development to meet the emerging and evolving demands for a successful career.

MAPPING OF MISSION STATEMENTS WITH PEOs

MS/PEO	PEO 1	PEO 2	PEO 3
MS 1	3	2	2
MS 2	3	3	2
MS 3	3	2	3
MS 4	2	3	3

1-Slight,　**2**- Moderate, **3**- Substantial

PROGRAM OUTCOMES
Graduates of Electrical and Electronics Engineering Will:

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Understand and apply the fundamental concepts of Basic and Engineering Sciences for appropriate up-skilling in the fast-emerging fields of Signal Processing, Image Processing, Communication, Networking, VLSI, Embedded Systems, Analog and Digital Technologies to meet the futuristic industrial achievements.

PSO 2: Apply latest hardware and software tools to solve complex electronics and communication engineering problems along with analytical skills to derive appropriate solutions in the real time applications across varied business and administrative functions.

Mapping of PEOs with POs and PSOs

PEO/PO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
PEO 1	3	3	3	2	2						1	1	3	1
PEO 2	2	3	3	2			2	2		3			3	3
PEO 3						1	1	1	1	2	1	3	3	1

1-Slight**, 2-** Moderate**, 3-** Substantial

2304501–MATLAB/PYTHON FOR ENGINEERS

Programme &Branch	B. Tech & ECE	Sem	Category	L	T	P	Credits
Prerequisites	Nil	3	Skill Enhancement course	0	1	2	2

Course Objectives:

1. Understanding the MATLAB software environment.
2. Demonstrate how MATLAB can be used to solve a range of mathematical problems.
3. Introduction about Polynomials, Curve Fitting, and Interpolation concepts.
4. Introduce basic concepts in Python programming language.
5. Introduce different types of decision control and iterative statements in python.

Preamble:	Now a days programming knowledge has become very essential for engineering professionals as well as scientists and researchers to develop simulation models, performing analysis, optimization & decision making. MATLAB and Python are two excellent tools for visualization and manipulation of engineering data as well as performing various engineering computations.

Course Contents:

Unit-1	Starting with MATLAB	Contact Hours: 9

Starting MATLAB, MATLAB Windows, working in the Command Window, Arithmetic Operations with Scalars, Display Formats, Elementary Math Built-In Functions, Defining Scalar Variables, Script Files.

Creating Arrays: Creating a 1-D vector array, creating a 2-D matrix array, Array Addressing, using a colon (:) in addressing arrays, Built-In Functions for handling arrays, Strings and Strings as Variables.

Unit-2	Mathematical Operations and 2D-Plotting	Contact Hours: 9

Addition and Subtraction, Array Multiplication, Array Division, Element-By-Element Operations, Built-in MATH Functions, Generation of Random Numbers, Examples of MATLAB Applications.

Two-Dimensional Plots: The *Plot* Command, the *fplot* Command, Plotting Multiple Graphs in the Same Plot, Plotting Multiple Graphs in the Same Plot, formatting a Plot, Plots with Logarithmic Axes, Plots with Error Bars, Plots with Special Graphics, Histograms, Polar Plots, Putting Multiple Plots on the Same Page, Multiple Figure Windows, Examples of MATLAB Applications.

Unit-3	Polynomials, Curve Fitting, and Interpolation	Contact Hours: 9

Value of a Polynomial, Roots of a Polynomial, Addition, Multiplication, and Division of Polynomials, Derivatives of Polynomials, Curve Fitting, Interpolation, The Basic Fitting Interface, Examples of MATLAB Applications, Introduction to Simulink.

Unit-4	Basics of Python Programming	Contact Hours: 9

Introduction, Features of Python, History of Python, Applications of Python, Literal constants: Numbers & Strings, Variables and Identifiers, Data Types, Input operation, Comments, Reserved Keywords, Indentation, Operators and Expressions: Arithmetic, Comparison, Assignment, Unary, Bitwise, Shift, Logical, Membership & Identity, Operations on strings: Concatenation, Multiplication & Slice a string, other data Types: Tuples, Lists & Dictionary, Type Conversion. A few example Programs using Python.

Unit-5	Decision Control Statements in Python	Contact Hours: 9

Introduction, conditional branching statements: *if*, *if-else*, Nested *if*, *if-elif-else* statements, Basic Loop statements: *while*, *for*, Nested Loops, *break, continue*, *pass, else* with Loops Statements. A few example Programs using Python.

		Total Hours: 45

Text Books:

1	MATLAB: An Introduction with Applications – Amos Gilat, Wiley Publishers, Fourth Edition.
2	Python Programming: Using Problem Solving Approach, R Thareja, Oxford University Press, 2017.

Reference Books:

1	Essential MATLAB for Engineers and Scientists – Brian H. Hahan and Daniel T. Valentine, Elsevier Publications, Fourth Edition.
2	Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024

Web References:

1	https://www.tutorialspoint.com/matlab/matlab_overview.htm
2	https://www.coursera.org/learn/python-for-applied-data-science-ai

COURSE OUTCOMES:		BT Mapped
Upon completion of the course, students shall have ability to		(Highest Level)
CO 1	Understand MATLAB basic concepts.	L2
CO 2	Understand various arithmetic operations on arrays and 2D Plotting in MATLAB.	L2
CO 3	Understand Relationships among two or more data points using curve fitting and interpolation in MATLAB.	L3
CO 4	Understand Python syntax, deftly utilizing basic programming concepts.	L2
CO 5	Apply conditional branching and loop statements to write basic programs in python.	L3

Mapping of Cos with POs and PSOs

COs/ POs	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2
CO 1	3	2	-	-	2	-	-	-	-	-	-	-	2	3
CO 2	3	2	-	-	2	-	-	-	-	-	1	-	2	3
CO 3	3	2	-	2	2	-	-	-	-	-	1	-	2	3
CO 4	3	2	-	-	2	-	-	-	-	-	-	-	2	3
CO 5	3	2	-	-	2	-	-	-	-	-	1	-	2	3
1 – Slight, 2 – Moderate, 3 – Substantial														