RAGHU ENGINEERING COLLEGE
AUTONOMOUS

**(Approved by AICTE, New Delhi, Accredited by NBA (CIV,ECE,MECH,CSE), NAAC with 'A⁺' grade
& Permanently Affiliated to JNTU-GV, Vizianagaram)**

Dakamarri, Bheemunipatnam Mandal, Visakhapatnam Dist. – 531 162 (A.P.)
Ph: +91-8922-248001, 248002 Fax: + 91-8922-248011
E-mail: principal@raghuenggcollege.com website: www.raghuenggcollege.com

RAGHU ENGINEERING COLLEGE (AUTONOMOUS) **VISAKHAPATNAM** **(Approved by AICTE, New Delhi, Accredited by NBA (CIV,ECE,MECH,CSE), NAAC with 'A⁺' grade** **& Permanently Affiliated to JNTU-GV, Vizianagaram)** Dakamarri, Bheemunipatnam Mandal, Visakhapatnam Dist. – 531 162 (A.P.) Ph: +91-8922-248001, 248002 Fax: + 91-8922-248011 E-mail: principal@raghuenggcollege.com website: 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.

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Department of Computer Science and Engineering

VISION

To generate competent professionals to become part of the industry and research organizations at the national and international levels.

MISSION

To impart high quality professional training in undergraduate level with emphasis on basic principles of computer science and Engineering and to foster leading edge research in the fast-changing field.

To inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities in the young minds so as to work with a commitment.

- M1:To impart high quality professional training at undergraduate level with emphasis on basic principles of computer science and Engineering and to foster leading edge research in the fast-changing field.
- M2:To inculcate innovative research capabilities and leadership abilities in the young minds so as to work with a commitment.
- M3:To inculcate professional behavior, strong ethical values in the young minds so as to work with a commitment.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

PEO 1: To produce graduates with a strong foundation in mathematics, science, engineering fundamentals, laboratory and work-based experiences to formulate and solve engineering problems in computer science engineering domains and shall have proficiency in implementation software tools and languages.

PEO 2: To progressively impart training to the students for success in various engineering positions within the core areas in computer science engineering, computational or adapting to the latest trends by learning themselves.

PEO 3: To produce graduates having the ability to pursue advanced higher studies and research. To have professional and communication skills to function as leaders and members of multidisciplinary teams in engineering and other industries with strong work ethics, organizational skills, teamwork, and understanding of the importance of being a thorough professional.

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MAPPING OF MISSION STATEMENTS WITH PEOs

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

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

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PROGRAM OUTCOMES	
Graduates of Computer Science and Engineering Will:	
PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex engineering problems.
PO 2	**Problem analysis:** Identity, 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 public health and safety and the cultural, societal, and environmental concerns.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods, including design of experiments, analysis, 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, 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 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 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.

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PROGRAM SPECIFIC OUTCOMES (PSOs)
PSO 1: Apply the concepts and techniques of the Computer Science & Engineering branch and the Mathematical foundations in the significant domains to address the complex engineering problems.
PSO 2: Employ emerging computer languages, computer networks, database management systems and platforms in developing innovative career prospects as an entrepreneur.
PS0 3: Apply the knowledge of interdisciplinary skills, and domain-specific tools in working system processes to implement and deploy a quality-based software product to meet evolving needs.

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	PSO-3
PEO 1	3	3	3	3	2	2	2	2		2		3	3	2	2
PEO 2	2	3	3	3	2	2	2	2	3	2	3	3	3	3	3
PEO 3	3	2	2	3	2	2	2	3	3	3	3	3	3	3	3

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

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DATA ANALYTICS(HONORS)							
(Common to CSM, CSD)							
Programme & Branch	**B.Tech & CSE**	**Sem**	**Category**	**L**	**T**	**P**	**Credit**
Prerequisites:	Python	**4**	Honors	**3**	**0**	**0**	**3**
Preamble :	**The main objectives of the course is to make student**						

Course Objectives:
- Understand Fundamental concepts of Data Analytics
- Be familiar with concept python modules in Analytics
- To understand the Data Gathering and Cleaning techniques.
- Be exposed to data analytics Visualization tools and techniques.
- Implement statistical and analytical tools and techniques.

Course Contents:

Unit-1	Introduction to Data Analytics: Overview and Data Analytics Lifecycle: Discovery, Data, Model Planning, Model Building, Communicate Results, Operationalize, Cross-Industry Standard Process for Data Mining (CRISP-DM)	Contact Hours: 9
Unit-2	Python for Data Analytics: Data Collections: Lists, Tuples, Dictionaries, Series, Panels, Data Frames, Data Frames NumPy module, Working with N-D Array, methods of NumPy, Pandas: Working with Pandas Data Frames, Data Wrangling using with Pandas, Aggregating Pandas Data Frames Processing Text: File I/O Processing, Data Input and Output, Opening and Closing Files, File Object Attributes, Reading and Writing to Files, Directories in Python, Regular Expressions, Regular Expression Patterns, Special Character Classes, Repetition Classes, Alternatives	Contact Hours:9
Unit-3	Data Gathering and Cleaning: Cleaning Data, Checking for Missing Values, Handling the Missing Values, Reading and Cleaning CSV Data, Merging and Integrating Data, Reading Data from the JSON Format, Reading Data from the HTML Format, Reading Data from the XML Format.	Contact Hours:9

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Unit-4	Data Visualization: Importance of Data Visualization, Need of Data Visualization in Modern Business, future of Data Visualization, Using Data Visualization for Business Decision – making , Easier Pattern Visualization Data Visualization Techniques , Loading Libraries , Popular Libraries for Data Visualization in Python, Introducing Plots in Python , Direct Plotting, Seaborn Plotting systems, Matplotlib Plot.	Contact Hours:9
Unit-5	Data Analysis: Series Data Structure: Creating a Series, Accessing Data from a Series with a Position, Exploring and Analyzing a Series, Operations on a Series. Data Frame Data Structure: Creating a Data Frame, Updating and Accessing, Column Selection Addition, Deletion, Row Selection, Addition, Deletion, Exploring and Analyzing a Data Frame Panel Data Structures, Creating and Accessing Data from a Panel with a Position. Data Analysis: Statistical Analysis, Data Grouping, Iterating Through Groups, Aggregations, Transformations, filtration.	Contact Hours:9
		Total Hours: 45

Text Books:

1	Data Science & Big Data Analytics – EMC – Wiley Publications
2	Data Analysis and Visualization using Python - Dr.Ossama Embarak
3	Hands on Data Analysis with Pandas – Second Edition – Stefanie Molin

Reference Books:

1	U Dinesh Kumar, "Data Analytics", Wiley Publications, 1st Edition, 2017
2	Wes McKinney : Python for Data Analysis 2nd Edition,Wiley,2013
3	Claus Wilke, "Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures", 1st edition, O'Reilly Media Inc, 2019.

Web References :

1	www. https://github.com/topics/data-analytics
2	https://www.udacity.com/course/intro-to-data-analysis--ud170?ranMID=53187&ranEAID=Vrr1tRSwXGM&ranSiteID=Vrr1tRSwXGM-.F2ewIL_oP8P3.tPW8w9FA&utm_source=affiliates
3	https://machinelearningmastery.com/time-series-forecasting-methods-in-python-cheat-sheet/

Preamble :	**After completion of the course, students will be able to**	
COURSE OUTCOMES:		**BT Mapped**
Upon completion of the course, students shall have ability to		(Highest Level)
CO1	Understand the fundamental concepts and lifecycle of Data Analytics, including the CRISP-DM methodology.	Understanding

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CO2	Gain proficiency in using Python for data analytics, including handling various data collections and performing file I/O operations.	Understanding
CO3	Acquire skills in data gathering, cleaning, and preprocessing, including handling different data formats such as CSV, JSON, HTML, and XML.	Applying
CO4	Develop the ability to create and interpret data visualizations using popular Python libraries like Matplotlib and Seaborn.	Applying
CO5	Learn to perform data analysis using pandas, including working with Series and Data Frame data structures and conducting statistical analysis, data grouping, and other transformations.	Applying

Mapping of Cos with POs

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	PSO-3
CO 1	3	2	-	-	1	-	-	-	-	-	-	1	3	2	-
CO 2	3	2	-	-	1	-	-	-	-	-	-	1	3	3	-
CO 3	2	1	-	-	1	-	-	-	-	-	-	1	2	3	-
CO 4	3	2	1	-	1	-	-	-	-	1	1	1	3	3	1
CO 5	3	2	1	-	1	-	-	-	-	1	1	1	3	3	1

ASSESSMENT PATERN – THEORY							
TEST	Remembering (K1)%	Understanding (K2)%	Applying (K3)%	Analyzing (K4)%	Evaluating (K5)%	Creating (K6)%	Total%
MID-1	25	30	30	15			100
MID-2	25	30	30	15			100
SEE	30	35	25	5			100
*± 3% may be varied							