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.)

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E-mail: principal@raghuenggcollege.com website: www.raghuenggcollege.com

RAGHU ENGINEERING COLLEGE (AUTONOMOUS)

VISAKHAPATNAM

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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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(2342101) AUTOMATA & COMPILER DESIGN

(Common to CSM CSD CSC CSO)

Programme &Branch	B.Tech- CSE	Sem	Category	L	T	P	Credit
Prerequisites:	Theory of Computations, Data Structures	**4**	Professional Core	**3**	**0**	**0**	**3**

Preamble : The main objectives of the course is to make student

Course Objectives:

The course objectives of **Automata & Compiler Design** are to discuss and make student familiar with the

- Knows and learn about various phases in the design of a compiler.
- Study the design of top-down and bottom-up parsers.
- Study about Syntax directed translation schemes.
- Introduce LEX and YACC tools.
- Learn different methods for both Machine Dependent and Independent Code Optimization.
- Learn to develop algorithms to generate code for a target machine.

Course Contents:

Unit-1	**Finite Automata:** Introduction to Finite State machine, Acceptance of strings and languages, Deterministic finite automaton (DFA) and Non-deterministic finite automaton (NFA), NFA with €-moves, Equivalence of NFA and DFA, Minimization of finite automata, finite automata with output – Moore and Mealy machines.	Contact Hours: 9
Unit-2	**Regular Languages:** Regular expressions, Identity rules, Conversion of finite automata into a regular expression, Pumping lemma for regular sets **Context Free Grammars:** Context free languages, Derivation trees, Ambiguous grammar, Pumping Lemma for Context free Languages, properties of context free languages.	Contact Hours: 9
Unit-3	**Introduction To Compiler:** Phases of Compilation, LL(1) parsing, Bottom-up parsing, handle pruning, LR Grammar Parsing, LALR parsing, A language for specifying Lexical Analyzers (LEX).YACC programming specification. Semantics: Syntax directed translation, S-attributed and L-attributed grammars.	Contact Hours: 9

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Unit-4	**Intermediate code –** abstract syntax tree, translation of simple statements, and control flow statements. **Context Sensitive features –** Chomsky hierarchy of languages and recognizers, type checking, type conversions, equivalence of type expressions, overloading of functions and operations.	Contact Hours: 9
Unit-5	**Code Optimization:** basic blocks and optimization of basic blocks, principal sources of optimization, directed acyclic graph (DAG) representation of basic block. **Code Generation:** Machine-dependent code generation, object code forms, peephole optimization, generic code generation algorithm, Register allocation and assignment.	Contact Hours: 9
		Total Hours: 45

Text Books:	
1	John E Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, "*Introduction to Automata Theory Languages and Computation*", 3rd Edition, Pearson Education, 2011.
2	Alfred Aho,Monica S Lam, RaviSethi, JeffreyD.Ullman, "*Compilers- Principles Techniques and Tool",* 2ndEdition, Pearson Education India, 2013.
Reference Books:	
1	Peter Linz, " *An introduction to Formal Languages and Automata*", 6th Edition, Jones & Bartlett, 2016
2	V.Raghavan, "*Principles of Compiler Design*",1stEdition,McGrawHillEducation,2017.
3	Mishra and Chandrashekaran, "*Theory of Computer Science – Automata Languages and Computation*", 3rd Edition, PHI, 2009
4	K.V.N.Sunitha , N.Kalyani, "*Formal Languages and Automata Theory*", 1st Edition, TMH, 2010
5	Michel Sipser, "*Introduction to Theory of Computation*", 2nd Edition, Thomson, 2012
Web References :	
1	Web Reference: https://swayam.gov.in/nd1_noc19_cs79/preview

Preamble:	After completion of the course, students will be able to

COURSE OUTCOMES: Upon completion of the course, students shall have ability to		**BT Mapped** (Highest Level)
CO 1	Explain finite state machines for modeling and their power to recognize the languages.	**Understanding**
CO 2	Summarize the concept of Regular languages and context free languages	**Understanding**
CO 3	Build the lexical and Syntax analyzer phases of compiler	**Applying**
CO 4	Model SDD's using Intermediate Representations	**Applying**
CO 5	Generate object code for natural language representations	**Evaluating**

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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	PSO 3
CO 1	3	2	-	-	1	-	-	-	-	-	-	1	-	1	-
CO 2	3	2	-	-	1	-	-	-	-	-	-	1	-	1	-
CO 3	2	1	-	-	1	-	-	-	-	-	-	1	-	1	-
CO 4	3	2	1	-	1	-	-	-	-	-	-	1	-	1	-
CO 5	3	2	1	-	1	-	-	-	-	-	-	1	-	1	-
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy															

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**							

(Signature)
Head of the Department
(Seal/Stamp)

(Signature)
Principal
(Seal/Stamp)