K.S.RANGASAMY COLLEGE OF ARTS AND SCIENCE, TIRUCHENGODE

DEPARTMENT OF COMPUTER SCIENCE -PG

ELECTIVE COURSES

| Course Code	Course name
Elective – I* (Semester II)	
18PCSEL201	Object Oriented Software Engineering
18PCSEL202	Software Testing
18PCSEL203	Software Project Management
18PCSEL204	Software Architecture
Elective – II* (Semester III)	
18PCSEL301	Digital Image Processing and Pattern Recognition
18PCSEL302	Soft Computing
18PCSEL303	Cloud Computing
18PCSEL304	Parallel Processing

* Student shall select any one of the Subject as Elective in II Semester and III Semester from Elective -I and Elective II respectively.

Encl:

- Copy of Scheme of Examination
- Syllabus copy of Elective Courses
- Mapping of the Elective Courses

HOD

(Department of Computer Science)

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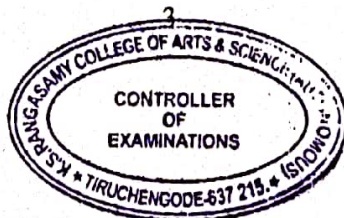TIRUCHENGODE-637 215.
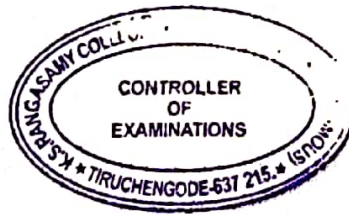
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SCHEME OF EXAMINATION

Subject Code	Subject	Hrs of Instruction	Exam Duration in Hrs	Maximum Marks			Credit Points
				CA	CE	Total	
First Semester							
Part A							
18PCSM101	Core I: Advanced Java Programming	5	3	25	75	100	4
18PCSM102	Core II: Design and Analysis of Algorithms	6	3	25	75	100	5
18PCSM103	Core III: Advanced Operating System	5	3	25	75	100	4
18PCSM104	Core IV: Network Security and Cryptography	5	3	25	75	100	4
18PCSMP101	Core Practical I: Advanced Java Programming	4	3	40	60	100	3
18PCSMP102	Core Practical II: PHP and MYSQL lab	4	3	40	60	100	3
Non-Credit							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
Total		30				600	23
Second Semester							
Part A							
18PCSM201	Core V: C# and ASP .Net Framework	4	3	25	75	100	4
18PCSM202	Core VI: Data Mining and Warehousing	5	3	25	75	100	5
	Elective I	5	3	25	75	100	4
18PCSMP201	Core Practical III: C# and ASP.Net Framework	4	3	40	60	100	3
18PCSMP202	Core Practical IV: Data Mining	4	3	40	60	100	3

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18PMACSI201	IDC I: : Discrete Mathematics	5	3	25	75	100	4

Part B							
18PVE201	Value Education : Human Rights	2	-	25	75	100	2

Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
	Total	30				700	25

Third Semester

Part A							
18PCSM301	Core VII: Big Data Analytics	6	3	25	75	100	5
18PCSM302	Core VIII: Internet of Things	6	3	25	75	100	5
	Elective II	5	3	25	75	100	4
18PCSMP301	Core Practical V: Mobile Application Development	4	3	40	60	100	3
18PCSMP302	Core Practical VI: Network and IoT Lab	4	3	40	60	100	3
18PMACSI301	IDC II: Resource Management Techniques	5	3	40	60	100	4
	Total	30				600	24

Fourth Semester

| Part A							
18PCSM401	Core IX: Python Programming	5	3	25	75	100	4
18PCSM402	Core X: Professional Ethics and Cyber Law	5	3	25	75	100	5
18PCSMP401	Core Practical VII: Python Programming Lab	4	2	40	60	100	3
18PCSPR401	Project & Viva -Voce	6		50	150	200	6
	Total	20	-			500	18
	Grand Total					2400	90

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LIST OF ELECTIVES

ELECTIVE – I

(Student shall select any one of the following subject as Elective in II semester)

S.No	Subject Code	Name of the Subject
1.	18PCSEL201	Object Oriented Software Engineering
2.	18PCSEL202	Software Testing
3.	18PCSEL203	Software Project Management
4.	18PCSEL204	Software Architecture

ELECTIVE – II

(Student shall select any one of the following subject as Elective in III semester)

| S.No	Subject Code	Name of the Subject
1.	18PCSEL301	Digital Image Processing and Pattern Recognition
2.	18PCSEL302	Soft Computing
3.	18PCSEL303	Cloud Computing
4.	18PCSEL304	Parallel Processing

FOR COURSE COMPLETION

Students shall complete:

1. Inter Disciplinary Courses (IDC) in II and III Semesters.
2. Value Education Course as Human Rights in II Semester.
3. Chosen Elective in II and III Semesters.
4. Career Competency Skills papers as non credit course in I & II Semesters.
5. Submission of project report at the end of IV Semester.

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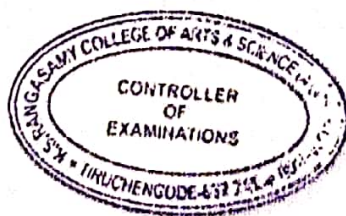
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18PCSEL201	ELECTIVE I: OBJECT ORIENTED SOFTWARE ENGINEERING	SEMESTER - II

Course Objectives:
- To acquire knowledge on basic concepts in Software engineering
- To know how to design and test a system using object oriented concepts

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	Introduction to Software Engineering : Introduction: Software Engineering Failures – Software Engineering – Software Engineering Concepts - Software Engineering Development Activities. Modeling Concepts – A Deeper View into UML - Project Organization and Communication : Project Organization Concepts – Project Communication Concepts - Organizational Activities.	10	CO1
II	Requirements Elicitation – Requirements Elicitation & its Activities - Managing Requirements Elicitation - Analysis: An Overview of Analysis – Analysis Concepts - Analysis Activities: From Use Cases to Objects - Managing Analysis.	10	CO2
III	System Design: An Overview of System Design – System Design Concepts – System Design Activities: From Objects to Subsystems – Addressing Design Goals - Managing System Design.	8	CO3
IV	Object Design: Reusing Pattern Solutions: Reuse Concepts: Solution Objects – Inheritance and Design Patterns – Reuse Activities: Selecting Design Patterns and Components – Managing Reuse – Interface Specification Concepts – Interface Specification Activities -Managing Object Design.	10	CO4
V	Testing: Testing Concepts - Testing Activities - Managing Testing - Configuration Management: An Overview of Configuration Management - Configuration Management Concepts - Configuration Management Activities - Managing Configuration Management.	12	CO5

Text Book

1	Bernd Bruegge and Allen. H. Dutoit. 2011. Object Oriented Software Engineering: Using UML, Patterns and Java. [Second Edition]. Pearson Education Asia, New Delhi

Reference Books

1	Timothy G Lethbridge and Robert Laganiere. 2005. Object-Oriented Software Engineering: Practical Software Development Using UML and Java. [Second Edition]. McGraw-Hill Higher Education, New Delhi.
2	Stephen R Schach. 2004. An Introduction to Object Oriented Systems Analysis and Design with UML and the Unified Process. [First Edition]. Tata McGraw-Hill, New Delhi..
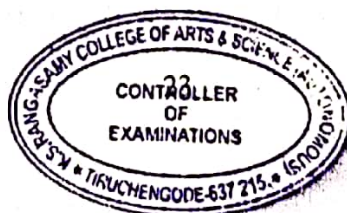
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Web References	
1	pl.cs.jhu.edu/oose/
2	https://www.tutorialride.com/software-engineering/
3	www.cse.lehigh.edu/~glennb/oose/oose.htm

COURSE OUTCOMES (CO)
After completion of the course , the students will be able to

CO1	Apply the Development activities and Modeling concepts
CO2	Evaluate the Requirement Elicitation and Analysis
CO3	Define Detailed information of System Design and Goals
CO4	Familiar with Object Design and Specification interface
CO5	Evaluate the Testing Activities and Configuration managemet

MAPPING

| PSO \ CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	L
CO2	M	M	M	L	H
CO3	M	H	M	M	H
CO4	M	H	H	M	H
CO5	M	H	M	M	H

H-High; M-Medium; L-Low

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18PCSEL202	ELECTIVE I: SOFTWARE TESTING	SEMESTER - II

Course Objectives:
- To Perform effective and efficient structural testing of a software
- To Integrate and test the various units and components of your software system
- To Perform effective and efficient functional testing of software
- To Select the appropriate tests to regression test your software after changes have been made

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Assessing Testing Capabilities and Competencies:** The Three-Step Process to Becoming a World-Class Testing Organization – Creating an Environment Supportive of Software Testing: Minimizing Risks: Risks Associated with Implementing Specifications – Writing a Policy for Software Testing – Testing - An Organizational Issue.	10	CO1
II	**Building the Software Testing Process:** Software Testing Guidelines – Workbench Concept – Customizing the Software-Testing Process – Selecting and Installing Software Testing Tools: Integrating Tools into the Tester's Work Processes – Tools Available for Testing Software – Selecting and Using Test Tools – Training Testers in Tool Usage – Appointing Tool Managers.	10	CO2
III	**Verification Testing:** Objective: – Workbench – Input – Do Procedures: Task 1: Test During the Requirements Phase – Task 2: Test During the Design Phase – Task 3: Test During the Programming Phase – Validation Testing: Objective: – Workbench – Input – Do Procedures: Task 1: Build the Test Data – Task 2: Execute Tests –Task 3: Record Test Results – Post-Implementation Analysis: Workbench – Do Procedures: Establish Assessment Objectives.	10	CO3
IV	**Software Development Methodologies:** Overview – Methodology Types – Software Development Life Cycle – Defining Requirements – Methodology Maturity – Competencies Required– Configuration-Management Controls – Testing Client / Server Systems : Overview – Workbench – Input – Do Procedures: Task 1: Assess Readiness – Taks 2: Assess Key Components – Task 3: Assess Client Needs.	10	CO4
V	**Rapid Application Development Testing:** Overview – Obejctive – Concerns – Workbench – Input – Do Procedures: Test Within Iterative RAD – Spiral Testing – Check Procedures Output – Guidelines – Testing Internal Controls: Overview – Internal Controls: Control Objectives – Preventive Controls – Detective Controls – Corrective Controls – Cost/Benefit Analysis - Testing Web-Based Systems: Overview – Workbench	10	CO5
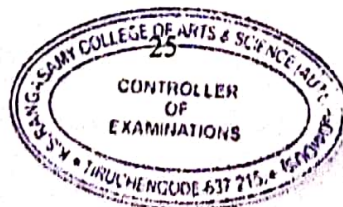
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– Input – Do procedures: Task 1: Select Web-Based Risks to Include in the Test Plan – Task 2: Select Web-Based Tests – Task 3: Select Web-based Test Tools – Task 4: Test Web-Based Systems.	

Text Book

1	William E Perry. 2006. **Effective Methods for Software Testing.** *[Third Edition].* Wiley Publication, New Delhi.

Reference Books

1	Edward Kit. 1995. **Software Testing in the Real World – Improving the Process.** *[Second Edition].* Addison-Wesley, Boston.
2	Elfriede Dustin. 2003. **Effective Software Testing: 50 Specific ways to improve your testing.** *[Second Edition].* Pearson Education, New Delhi.

Web References

1	https://www.guru99.com/software-testing.html
2	https://www.tutorialspoint.com/software_testing/index.htm
3	www.softwaretestinghelp.com/manual-testing-tutorial-1

COURSE OUTCOMES (CO)

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

CO1	Define world class testing organization
CO2	Analyze the testing process,testing tools and trainers.
CO3	Apply the testing verification process
CO4	Analyze the software development methodologies
CO5	Evaluate different types of testing process

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	H
CO2	L	M	M	M	H
CO3	L	M	M	M	H
CO4	L	M	H	M	H
CO5	L	M	M	M	H

H-High; M-Medium; L-Low

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18PCSEL203	ELECTIVE I: SOFTWARE PROJECT MANAGEMENT		SEMESTER - II	
Course Objectives:				
• To know how a project can be broken down into stages and its contribution to the project				
• Enables to select appropriate techniques for various stages of a project and apply them in practical situations				
			Total Hours: 50	
UNIT	**CONTENTS**		**Hrs**	**CO**
I	Introduction to Software Project Management: Introduction - Software Project Management Importance – Activities Covered by Software Project Management – Plans, Methods and Methodologies – Categorizing Software Projects – Setting Objectives - Management – Management Control – Step Wise : An Overview of Project Planning.		10	CO1
II	Selection of an Appropriate Project Approach: Choosing Methodologies and Technologies – Choice of Process Models – The Waterfall Model – The Spiral Model – Software Prototyping – Other ways of Categorizing Prototypes - Software Effort Estimation: The Basis for Software Estimating – Software Effort Estimation Techniques – Expert Judgment – Estimating by Analogy.		10	CO2
III	Activity Planning: The OBJECTIVE::s of Activity Planning – Project Schedules – Projects and Activities – Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Model – Adding the Time Dimension – The Forward Pass –The Backward Pass – Identifying the Critical Path - Risk Management: Risk – Categories of Risk – A Framework for Dealing with Risk – Risk Identification - Risk Assessment – Risk Planning – Risk Management – Applying the PERT Technique.		10	CO3
IV	Resource Allocation: The Nature of Resources – Identifying Resource Requirements– Scheduling Resources – Creating Critical Paths – Counting the Cost – Cost Schedules– Monitoring and Control: Creating the Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring.		10	CO4
V	Software Quality: The Place of Software Quality in Project Planning – The Importance of Software Quality – Defining Software Quality – Product Versus Process Quality Management – Techniques to help Enhance Software Quality – Quality Plans.		10	CO5
Text Book				
1	*Bob Hughes , Mike Cotterell and Rajib Mall. 2011.* **Software Project Management.** *[Fifth Edition]. Tata Mc-Graw Hill, New Delhi.*			

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Reference Books	
1	Walker Royce. 2007. Software Project Management. [Second Edition]. Pearson Education, New Delhi.
2	Andrew Stellman and Jennifer Greene. 2005. Applied Software Project Management. [First Edition]. O'Reilly Publications, New York.
3	Pankaj Jalote. 2002. Software Project Management in Practice. [First Edition]. Pearson Education, New Delhi.

Web References	
1	https://www.tutorialspoint.com › Software Engineering › Software Project Management
2	https://www.mavenlink.com/resources/what-is-project-management-software
3	https://www.techopedia.com/definition/13132/project-management-software

COURSE OUTCOMES (CO)

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

CO1	Familiar with the Project management Methodologies and Categories of Software Project
CO2	Apply the Various types of Software Development Models
CO3	Define the Activity planning and Risk Management
CO4	Analyze the Resource Allocation and Cost Control Management
CO5	Evaluate the Quality planning and Product

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	M	H
CO2	M	H	M	M	H
CO3	M	H	H	M	H
CO4	L	M	M	M	H
CO5	L	M	M	H	H

H-High; M-Medium; L-Low

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18PCSEL204	ELECTIVE I: SOFTWARE ARCHITECTURE	SEMESTER - II

Course Objectives:

- To work from stakeholder requirements to create system interfaces that support partitioning
- To use different view points to organize partitioning to support deployment, maintenance and functional extension
- To document system commonalities and variability

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	The Architecture Business Cycle: Where Do Architectures Come From – Software Processes and the Architecture Business Cycle - What Makes a Good Architecture.	10	CO1
II	Software Architecture: Software Architecture Is and What it Isn't – Other Points of View – Software Architecture Importance.	10	CO2
III	Understanding Quality Attributes: Functionality and Architecture – Architecture and Quality Attributes – System Quality Attributes – Quality Attribute Scenarios in Practice	10	CO3
IV	Achieving Qualities: Introducing Tactics – Availability Tactics – Modifiability Tactics – Performance Tactics – Security Tactics – Testability Tactics.	10	CO4
V	Documenting Software Architectures: Uses of Architectural Documentation - Views– Choosing the Relevant Views – Documenting a View – Unified Modeling Language.	10	CO5

Text Book

1	Len Bass, Paul Clements and Rick Kazman. 2010. Software Architecture in Practice. [Second Edition]. Pearson Education Inc, New Delhi.

Reference Books

1	Peter Eeles and Peter Cripps. 2010. The Process of Software Architecting 2010. [First Edition]. Addison –Wesley, Boston.
2	Nick Rozanski and Eóin Woods. 2012. Software Systems Architecture. [Second Edition]. Addison –Wesley, Boston. Richard N.Taylor and Nenad Medvidovic Eric M. Dashofy. 2010. Software Architecture: Foundations, Theory, and Practice Author. [First Edition]. John Wiley and Sons, New York..

Web References

1	tutorials.jenkov.com/software-architecture/index.html
2	https://www.tutorialride.com/software-architecture.../software-architecture-and-design
3	www.developerfusion.com › Architecture › Tutorials

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COURSE OUTCOMES (CO)
After completion of the course , the students will be able to

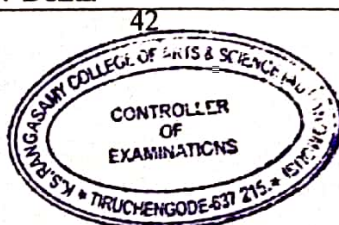| CO1	Expertise in Software Architecture Business Cycle
CO2	Define the Importance of Software Architecture
CO3	Apply the Software quality Attributes
CO4	Evaluate the Tactics for Achieving quality
CO5	Familiar with the Complete documentation of Architecture Implementation

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	H
CO2	M	H	M	M	H
CO3	M	M	L	M	H
CO4	M	M	L	M	H
CO5	M	H	M	M	H

H-High; M-Medium; L-Low

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18PCSEL301	ELECTIVE II : DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION	SEMESTER- III

Course Objectives:
- To acquire basic concepts of signals.
- Gather knowledge on mathematical transformations used in image processing.
- To impart knowledge about image enhancement and pattern recognition.

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	Introduction: The World of Signals: One-Dimensional Signals - Two-Dimensional Signals - Three-Dimensional Signals – Multidimensional Signals. Digital Image Processing: Elements of an Image Processing System. Mathematical Preliminaries: Laplace Transform - Fourier Transform – Z-Transform - Cosine Transform - Wavelet Transform.	10	CO1
II	Image Enhancement: Grayscale Transformation - Piecewise Linear Transformation - Bit Plane Slicing - Histogram Equalization – Smoothing Filter - Sharpening Filter - Image Blur Types and Quality Measures.	10	CO2
III	Image Segmentation: Threasholding - Object (Component) Labeling - Locating Object Contours by the Snake Model-Edge Operators - Edge Linking by Adaptive Mathematical Morphology - Automatic Seeded Region Growing – Applications: Potentional in Medical Image Analysis.	10	CO3
IV	Feature Extraction: Fourier Descriptor and Moment Invariants - Shape Number and Hierarchical Features - Corner Detection - Hough Transform - Principal Component Analysis - Linear Discriminate Analysis.	10	CO4
V	Pattern Recognition: The Unsupervised Clustering Algorithm - Bayes Classifier – Support Vector Machine - Neural Networks - The Adaptive Resonance Theory Network: The ART1 Model and Learning Process - The ART2 Model-Applications: Solar Image Processing and Analysis.	10	CO5

Text Book

1. *Frank Y. Shih.* 2010. Image processing and pattern recognition: Fundamentals and Techniques . [First Edition]. John Wiley and Sons, New York. IEEE Press.

Reference Books

1. *Bernd Jahne.* 2009. Digital Image Processing . [sixth revised and extended edition]. Springer New York . [First Indian Edition].
2. *Tamal Base.* 2004. Digital Signal and Image Processing . John Wiley & Sons Inc, New York. [Wiley Student Edition].
3. *Krishnamorthy, R.* 2010. Advances in Image Processing , Mining and Computing Technology . [First Edition]. ACME Learning Private Limited, New Delhi.
4. *Rafael C Gonzalez, Richard E Woods.* 2008. Digital Image Processing. [Third Edition]. Pearson Education Inc, New Delhi.

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Web References	
1	https://www.geeksforgeeks.org/digital-image-processing-basics
2	https://www.tutorialspoint.com/dip/image_processing_introduction.htm
3	https://en.wikipedia.org/wiki/Digital_image_processing

COURSE OUTCOMES (CO)

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

CO1	Describe the basic concepts of signals and digital properties of image.
CO2	Interpret the various image enhancement techniques.
CO3	Analyze the image representation in more meaning full and easy by applying process of partitioning methods.
CO4	Realise dimensionality reduction that efficiently represents the image and apply the image data in computer vision.
CO5	Apply the machine learning in discovery of knowledge in image processing.

MAPPING

| PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	H	H	M
CO2	L	H	H	M	L
CO3	M	H	H	H	H
CO4	L	L	H	H	M
CO5	L	H	H	H	M

H-High; M-Medium; L-Low

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18PCSEL302	ELECTIVE III: SOFT COMPUTING	SEMESTER- III

Course Objectives:

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.
- To provide the mathematical background for carrying out the optimization associated with neural network learning.

Total Hours: 50

Unit	Contents	Hours	CO
I	**Introduction to Artificial Intelligence and Soft Computing:** Artificial Intelligence -The Turing Test - Soft Computing - Fuzzy Logic- Genetic Algorithms: Probabilistic Computing - Rough Sets – Other Domains of AI: Swarm Intelligence- Chaos - Export Systems - Hybrid Intelligent Systems.	10	CO1
II	Overview of Neural Networks - Basic Concepts –Biological Neuron- Modeling and Artificial Neuron- Major Components of an Artificial Neuron - Neural Network Architectures – Learning Technologies –Advantages and Disadvantages of Neural Network – Application Areas of Neural Network.	10	CO2
III	**Learning in Feedforward Networks:** The Preceptron- LMS Learning Rule - Steepest Descent Algorithm - Multilayer Preceptorn - Back Propagation- Applications of Back Propagation Model - Neural Networks as Associate Memory.	10	CO3
IV	**Introduction to Fuzzy Logic and Fuzzy set Theory:** Crisp Sets – An Overview of Fuzzy Sets - Types of Membership Functions - Operations on Fuzzy Sets - Properties of Fuzzy Sets – Some Basic Concepts About Fuzzy Sets - Geometric Representation of Fuzzy Sets - Fuzzy and Crisp Relations	10	CO4
V	**Fuzzy Rules and Fuzzy Rule-Based System:** Classical Logic: An Overview of Predicate Logic - Fuzzy Proposition Logic - Fuzzy if-then rules - Fuzzy Inference Systems - Fuzzy Controllers - Genetic Algorithms - Fundamental of Genetic Algorithm.- The Algorithm Encoding – The GA Operators - Advantages , Limitations and Applications of Genetic Algorithms - Related Techniques.	10	CO5

Text Book

1	*Manish Mahajan, Rajdev Tiwari. 2010.* Introduction to Soft Computing.[First Edition]. ACME Learning Private Limited, New Delhi.
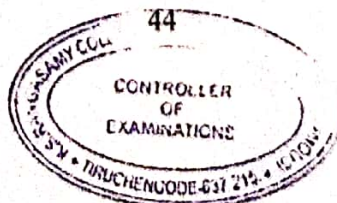
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Reference Books	
1	Jang, Chuen-Tsai Sun and Eiji Mizutani. 1997. **Neuro-Fuzzy and Soft Computing A Computational approach to learning and machine intelligence.** [First Edition]. Prentice-Hall Inc, New Delhi.
2	Sivanandam, S.N. and Deepa, S.N. 2007. **Principles Of Soft Computing.** [First Edition]. Wiley-India, New Delhi.
3	Andrea Tettamanzi and Marco Tomassini. 2010. **Soft Computing: Integrating Evolutionary, Neural, and Fuzzy Systems.** [First Edition]. Springer, US.

Web References	
1	https://whatis.techtarget.com/definition/soft-computing
2	https://www.quora.com/What-is-soft-computing-What-are-the-some-real-life-applications-of-soft-computing
3	https://www.igi-global.com/dictionary/soft-methods

COURSE OUTCOMES(CO)

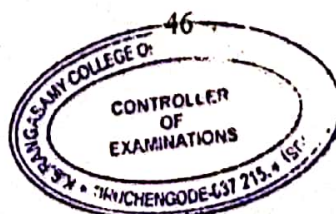After completion of the course , the students will be able to

CO1	Define the overview of Intelligent systems that leads expert systems and scope of their applications in real world problems wich has significant complexity.
CO2	Explain the algorithms that can be used to model complex patterns and prediction problems.
CO3	Concive knowledge in CPU based automatic controls in feed forward networks wich is used expert and AI doains.
CO4	Gain the experience in multiobjective optimization of power systems is derivied form fuzzy logic.
CO5	Concieve knowledge how genetic programming used in fuzzy systems.

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	M
CO2	L	H	M	H	M
CO3	L	H	M	H	L
CO4	M	H	M	H	M
CO5	L	H	H	H	M

H-High; M-Medium; L-Low

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18PCSEL303	ELECTIVE III: CLOUD COMPUTING	SEMESTER - III

Course Objectives:

- To gather knowledge on the emerging area cloud computing and how it relates to traditional models of computing.
- To know about cloud architecture, Virtualization Technologies.
- To study about cloud Security and Service Oriented Architecture.

Total Hours: 50

Unit	Contents	Hrs	CO
I	**Cloud Computing Basics:** Definition - Cloud types: The NIST Model - The Cloud Cube Model - Deployment Models - Service Models - Characteristics of Cloud Computing: Paradigm shift - Benefits of cloud computing - Disadvantages of cloud computing - Assigning the role of Open Standards. Measuring the cloud's value - Cloud Architecture: Exploring the cloud computing stack.	11	CO1
II	**Understanding Services and Applications by Type:** Defining Infrastructure as a Service - Defining Platform as a Service - Defining Software as a Service – Defining Identity as a Service - Understanding Abstraction and Virtualization: Virtualization Technologies – Load Balancing and Virtualization - Understanding Hypervisors- Machine Imaging – Porting Applications	10	CO2
III	**Platform as a Service:** PaaS Applications Frameworks – Using Amazon Web Services: Amazon Web service components and Services – Working with Elastic Compute Cloud (EC2) – Working with Amazon Storage systems - Understanding Amazon Database Services	10	CO3
IV	**Microsoft Cloud Services:** Exploring Microsoft Cloud services – Windows Azure Platform - Cloud Security : Securing the Cloud – Securing Data –Establishing Identity and Presence.	9	CO4
V	**Service Oriented Architecture :** Introduction – Event driven Service Oriented Architecture –Enterprise Service Bus – Service Catalogs – SOA Communications – Managing and Monitoring SOA - Cloud Storage: Provisioning Cloud Storage - Unmanaged Cloud Storage - Managed Cloud Storage – Creating Cloud Storage Systems – Virtual Storage Containers.	10	CO5

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Text Book	
1	*Barrie Sosinsky.* 2011. **Cloud Computing Bible.** [First Edition].Wiley Publishing, New Delhi.

Reference Books	
1	*Haley Beard.* 2008. **Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs** . [First Edition]. Emereo Pvt. Limited, Cyprus.
2	*George Reese.* 2009. **Cloud Application Architectures: Building Applications and Infrastructure in the Cloud.** [First Edition]. Oreily's Publications, New York.

Web References	
1	https://geekflare.com/cloud-computing-basics/
2	https://www.tutorialspoint.com/cloud_computing/cloud_computing_architecture.htm
3	https://www.tutorialride.com/cloud-computing/cloud-computing-architecture.htm

COURSE OUTCOMES(CO)

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

CO1	Define the different types of Cloud models and its Architecture.
CO2	Apply the suitable virtualization models in different service types.
CO3	Access the web services , Storage systems and Data Services.
CO4	Educate the working style of cloud services and security.
CO5	Evalaute SOA architecture and storage of cloud systems.

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	H	M
CO2	M	M	H	H	M
CO3	L	H	H	H	M
CO4	L	H	H	H	H
CO5	M	H	H	H	M

H-High; M-Medium; L-Low

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18PCSEL304	ELECTIVE III: PARALLEL PROCESSING	SEMESTER - III

Course objectives:
- To study the concepts of computer architectures.
- To understand the methods of parallel processing.
- To study about various architectures- based on pipeline, array and multiprocessing systems.

Total Hours: 50

Unit	Contents	Hrs	CO
I	**Computer Evolution and Function:** Computer Evolution and Performance - A Brief History of Computers - Designing for Performance - Pentium and PowerPC Evolution - Computer Components - Computer Function - Interconnection Structures - Bus Interconnection - PCI.	10	CO1
II	**Cache Memory:** Computer Memory System Overview - Cache Memory Principles - Elements of Cache Design - Cache Size- Mapping Function- Multilevel Caches- Pentium IV Cache Organization- Performance Characteristics of Two-Level Memories - Semiconductor Main Memory- Error Correction- Advanced DRAM Organization.	10	CO2
III	**Peripherals:** Magnetic Disk Read and Write Mechanisms- Optical Memory- Programmed I/O – Interrupt-Driven I/O- Intel 82C59 A Interrupt Controller- The Intel 82C55A Programmable Peripheral Interface – Types of Interfaces - Fire Wire Serial Bus- InfiniBand.	10	CO3
IV	**Operating System Support and Processor :** Types of Operating Systems – Scheduling - Memory Management - Processor Organization - Register Organization – Instruction Cycle - Instruction Pipelining- Characteristics of RISC Architecture- CISC Verses RISC Characteristics- RISC Pipelining- MIPS R4000.	10	CO4
V	**Parallel Processing:** Instruction-Level Parallelism And Superscalar Processors: Super Scalar verses Super pipelined Systems- Multiple Processor Organizations- Symmetric Multiprocessors Organizations - Cache Coherence and the MESI Protocol- Multithreading and Chip Multiprocessors – Clusters – Integer Arithmetic- Floating Point Arithmetic- Vector Computation.	10	CO5

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Text Book	
1	*William Stallings.* 2009. **Computer Organization & Architecture.** [Eighth Edition]. PHI, New Delhi.
Reference Books	
1	*Kai Hwang, Faye A. Briggs.* 2000. **Computer Architecture And Parallel Processing.** [Second edition]. McGraw Hill, New Delhi.
2	*John.P.Hayes.* 1998. **Computer System Architecture and Parallel Processing.** [Third Edition]. McGraw Hill, New Delhi.

Web References	
1	https://www.webopedia.com/TERM/P/parallel_processing.html
2	https://www.computerhope.com › Dictionary › P = Definitions
3	https://www.quora.com/What-is-parallel-processing

COURSE OUTCOMES(CO)

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

CO1	Evaluate the performance of PC with respect to the different generations.
CO2	Define the cache memory organization and performance characteristics.
CO3	Gain the knowledge in I/O operations and types of interfaces.
CO4	Familiar with various tasks of operating system and the architecture of processor.
CO5	Explain the parallel processing in different types of processors.

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	M	M	L
CO2	M	H	H	H	M
CO3	L	H	H	H	M
CO4	L	H	H	H	H
CO5	M	H	H	H	M

H-High; M-Medium; L-Low

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