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

DEPARTMENT OF COMPUTER SCIENCE –PG

NEW COURSES INTRODUCED

Name of the Course	Course Code
18PCSM103	Core III: Advanced Operating System
18PCSM104	Core IV: Network Security and Cryptography
18PMACSI201	IDC I: : Discrete Mathematics
18PCSM302	Core VIII: Internet of Things
18PCSMP302	Core Practical VI: Network and IoT Lab
18PCSM401	Core IX: Python Programming
18PCSMP401	Core Practical VII: Python Programming Lab

Encl:

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

HOD

(Department of Computer Science)

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COE

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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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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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18PCSM103	CORE III: ADVANCED OPERATING SYSTEMS	SEMESTER - I

Course Objectives:

- To make a clear understanding of the advanced concepts and techniques of an operating system
- To learn the essential concepts of Deadlocks and Synchronization in various Operating System environment
- To gain Knowledge of Distributed Operating System

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Overview of Operating Systems:** OS and the Computer System – Efficiency, System Performance and User Convenience – Classes of Operating Systems. **Scheduling:** Non-preemptive Scheduling Policies – Preemptive Scheduling Policies – Scheduling in Practice – Real Time Scheduling.	10	CO1
II	**Memory Management :** Managing the Memory Hierarchy – Static and Dynamic Memory Allocation – Memory Allocation to a Process – Reuse of Memory – Contiguous Memory Allocation – Noncontiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Kernel Memory Allocation. **Virtual Memory:** Demand Paging – Page Replacement Policies – Memory Allocation to a Process – Shared Pages – Memory Mapped Files.	10	CO2
III	**Deadlock:** Definition – Deadlocks in Resource Allocation – Handling Deadlocks -Deadlock Detection and Resolution – Deadlock Prevention – Deadlock Avoidance.	10	CO3
IV	**Synchronization and Scheduling in Multiprocessor Operating Systems(with case study):** Architecture of Multiprocessor Systems – Multiprocessor Operating Systems – Kernel Structure - Process Synchronization – Process Scheduling.	10	CO4
V	**Distributed Operating Systems:** Features of Distributed Systems – Nodes of a Distributed System – Network Operating Systems – Distributed Operating Systems- Reliable Interposes Communication – Distributed Computation Paradigms.	10	CO5

Text Book

1. *Dhamdhere D.M. 2010.* **Operating Systems – A Concept based Approach.** *[Second Edition]. Tata McGraw Hill. New Delhi.*

Reference Books

1. *Andrew S Tanenbaum. 2001.* **Modern Operating System.** *[Third Edition]. PHI-Pearson Education Asia. New Delhi.*
2. *William Stallings. 2007.* **Operating Systems Internals and Design Principles.** *[Fifth Edition]. Prentice Hall of India. New Delhi.*

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Web References	
1	https://www.tutorialspoint.com/operating_system/index.html
2	https://www.studytonight.com/operating-system/
3	https://www.csitquestion.com/operating-system/

COURSE OUTCOMES (CO)

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

CO1	Define the Fundamental concepts of an Operating System and Scheduling policies
CO2	Explain the Detailed Memory Management techniques and Virtual Memory concepts
CO3	Apply the Scheduling Task in Multiprocessor Architecture
CO4	Analyze the Deadlock and Resource Allocation concepts
CO5	Evaluate the Detailed Architecture of Distributed Operating Systems

MAPPING

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

H-High; M-Medium; L-Low

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18PCSM104	CORE IV: NETWORK SECURITY AND CRYPTOGRAPHY	SEMESTER - I

Course Objectives:

- To impart basic categories of threats to computers and networks
- To study about the Intrusions and intrusion detection systems
- To acquire fundamental ideas of public-key cryptography techniques

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Classical Encryption Techniques:** Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Block Cipher Principles – The Data Encryption Standard.Advanced Encryption Standard: AES Structure – AES Transformation Functions - Block Cipher Operation: Electronic Code Book – Cipher Block Chaining Mode – Cipher Feedback Mode – Output Feedback Mode – Counter Mode.	10	CO1
II	**Introduction to Number Theory:** Fermat's and Euler's Theorems – The Chinese Remainder Theorem – The RSA Algorithm - Other Public-Key Cryptosystems: Diffie-Hellman Key Exchange – Elliptic Curve Arithmetic – Elliptic Curve Cryptography.	10	CO2
III	**Cryptographic Hash Functions:** Two Simple Hash Functions – Hash Functions Based on Cipher Block Chaining - Message Authentication Codes: Message Authentication Functions – Security of MACs – Digital Signatures: Introduction - Digital Signature Standard.	10	CO3
IV	**User Authentication:** Kerberos – Electronic Mail Security: Private Good Privacy - IP Security: IP Security Overview – IP Security Policy - Encapsulation Security Payload – Transport Level Security: Web Security Considerations – Secure Socket Layer and Transport Layer Security.	10	CO4
V	**Intruders:** Intrusion Detection – Password Management – Malicious Software: Types of Malicious Software – Virus Countermeasures – Worms – Distributed Denial of Service Attacks – Firewalls: Types of Firewalls - Firewall Location and Configurations.	10	CO5

Text Book

1. *William Stallings. 2011.* **Cryptography and Network Security – Principles and Practices.** *[Fifth Edition]. Pearson Education, New Delhi..*

Reference Books

1. *Atul Kahate. 2003.* **Cryptography and Network Security.** *[Second Edition.]. Tata McGraw Hill, New Delhi.*
2. *Bruce Schneier. 2001.* **Applied Cryptography.** *[Second Edition]. John Wiley & Sons Inc, New York.*

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Web References	
1	https://www.tutorialspoint.com/cryptography/
2	https://www.tutorialspoint.com/network_security/index.htm
3	nptel.ac.in/courses/106105031/

COURSE OUTCOMES (CO)

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

CO1	Apply the basic techniques and advanced standards of Encryption
CO2	Familiar with the number Theory implementation in various cryptosystems
CO3	Define Hash function and Digital Signature conceptions
CO4	Analyze the User Authentication and web Security considerations
CO5	Expertise about Intrusion Detection, types of Virus, Worms and Firewalls

MAPPING

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

H-High; M-Medium; L-Low

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18PMACSI201	INTER DICIPLINARY COURSE I: DISCRETE MATHEMATICS	SEMESTER – II

Course objectives:

The Course aims

- To introduce mathematical logics and theory of automata
- To introduce basic concepts of graph theory

Total Hours: 50

UNIT	CONTENTS	Hrs.	CO
I	Logic – Introduction – TF-statements – Connectives – Atomic and Compound statements – Well formed formulae – Truth table of a formula – Tautology. **(Chapter – 9 Sections: 1 – 7)**	10	CO1
II	Tautological implications and equivalence of formulae – Replacement process – Functionally complete sets of connectives and duality law – Normal forms – Principal normal forms. **(Chapter – 9 Sections: 8 - 12)**	10	CO2
III	Theory of inference – Open statements – Quantifiers. **(Chapter – 9 Sections: 13 – 15)**	10	CO3
IV	Boolean algebra – Boolean polynomials – Karnaugh map (K-map for 5 variables and 6 variables are not included) – Switching circuits (Simple circuits). **(Chapter: 10 Sections: 5 – 8)**	10	CO4
V	Graph Theory – Basic concepts – Matrix representation of graphs – Trees – Spanning trees. **(Chapter: 11 Sections: 1 – 4)**	10	CO5

Text Books

1	*Venkataraman, M.K. Sridharan, N. and Chandrasekaran, N.,* 2000. **Discrete Mathematics.** The National Publish Company, New Delhi.
2	*Mishra, K.L.P., and Chandrasekaran, N.,* 2001. **Theory of Computer Sciences.** [Second Edition]. Prentice Hall of India Private Limited, New Delhi.

Reference Book

1	*Trembley, J.P. and Manohar, R.,* 1975. **Discrete Mathematical Structures with applications to computer Science.** International Edition, McGraw Hill Publication.

COURSE OUTCOMES (CO)

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

CO 1	Learn the concepts of logic
CO 2	Discuss various normal forms
CO 3	Understand the concepts of inference theory
CO 4	Construct Karnaugh map and switch circuits
CO 5	Know the concepts of graphs and trees

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MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	H	M	H	M	L
CO 2	H	M	H	M	L
CO 3	M	H	M	L	M
CO 4	M	H	H	L	M
CO 5	M	H	H	M	M

H-High; M-Medium; L-Low

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18PCSM302	CORE VIII: INTERNET OF THINGS	SEMESTER- III

Course Objectives:

- To know about Smart Objects, Architectures of IoT and its protocols.
- To build simple IoT Systems using Arduino and Raspberry Pi.
- To understand data analytics and develop IoT infrastructure for effective applications.

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	Evolution of Internet of Things – Enabling Technologies – IoT **Architectures:** oneM2M, IoT World Forum (IoTWF) and Alternative IoT models – Simplified IoT Architecture and Core IoT Functional Stack - Fog, Edge and Cloud in IoT – Functional blocks of an IoT ecosystem – Sensors, Actuators, Smart Objects and Connecting Smart Objects.	10	CO1
II	**IoT Access Technologies:** Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – **Network Layer:** IP versions, Constrained Nodes and Constrained Networks – **Optimizing IP for IoT:** From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – **Application Transport Methods:** Supervisory Control and Data Acquisition – **Application Layer Protocols:** CoAP and MQTT.	10	CO2
III	Design Methodology – Embedded computing logic – Microcontroller, System on Chips – IoT system building blocks – Arduino – Board details, IDE programming – Raspberry Pi – Interfa ces and Raspberry Pi with Python Programming.	10	CO3
IV	Structured Vs Unstructured Data and Data in Motion Vs Data in Rest – Role of Machine Learning – No SQL Databases – Hadoop Ecosystem – Apache Kafka, Apache Spark – Edge Streaming Analytics and Network Analytics – Xively Cloud for IoT, Python Web Application Framework – Django – AWS for IoT – System Management with NETCONF-YANG.	10	CO4
V	Cisco IoT system – IBM Watson IoT platform – Manufacturing – Converged Plantwide Ethernet Model (CPwE) – Power Utility Industry – GridBlocks Reference Model – Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control	10	CO5

Text Book

1 *David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry,2017.* **IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things,** Cisco Press.

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Reference Books	
1	*Arshdeep Bahga, Vijay Madisetti,2015.* **Internet of Things – A hands-on approach, Universities Press.**
2	*Olivier Hersent, David Boswarthick, Omar Elloumi. 2012.* **The Internet of Things – Key applications and Protocols, Wiley,** (for Unit 2).
3	Jan Ho¨ ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle. 2014 **From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence,** Elsevier.
4	*Michael Margolis, Arduino Cookbook. 2011 Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O'Reilly Media.*

Web References	
1	https://nevonprojects.com/iot-projects
2	https://circuitdigest.com/internet-of-things-iot-projects
3	https://www.skyfilabs.com/blog/raspberry-pi-based-iot-projects

COURSE OUTCOMES (CO)

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

CO1	Explain the detailed architecture, stack of IoT and functional blocks of IoT Eco System.
CO2	Define the network, security and transport methods of IoT.
CO3	Analyse the streaming analytics and network analytics with Machine learning techniques.
CO4	Apply the Machine leraning techniques over cloud environment.
CO5	Define the IoT reference models and smart architecture.

MAPPING

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

H-High; M-Medium; L-Low

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18PCSMP302	CORE PRACTICAL VI: NETWORK AND IOT LAB	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- To explore the networking concepts using CISCO PACKET TRACER simulator.
- To exemplify IoT concepts using ARDUINO and RASPBERRY PI.

Total Hours: 40

PROGRAM	CONTENTS	Hrs.	CO
1	Identification of various networks components – connections, BNC, RJ-45, I/O box- Cables- Co-axial, twisted pair, UTP- NIC(network interface card) – Switch, hub	04	CO 1
2	(a) Sketch wiring diagrams of network cabling considering a computer lab of 20 systems (b) Interfacing with the network card(Ethernet) and Preparing of network cables	04	CO 1
3	Establishment of LAN and Use of protocols in establishing LAN	04	CO 2
4	Installation of network device drivers, networks (Peer to Peer Networking client server interconnection) and proxy server	04	CO 2
5	IoT Exemplification using ARDUINO	04	CO 3
6	IoT Exemplification using RASPBERRY PI	04	CO4
7	Trouble shooting of networks	04	CO4
8	File Transfer Protocol.	04	CO4
9	HTTP Server.	04	CO5
10	Class, Network and Host ID.	04	CO5

Web Reference

1. https://data-flair.training/blogs/how-iot-works
2. https://www.tutorialspoint.com/internet_of_things

COURSE OUTCOMES (CO)

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

CO 1	Configure networking components for connection establishment .
CO 2	Design simple and complex network architecture.
CO 3	Install device drivers and servsers for effective network communications.
CO 4	Connect the ARDUIO with other interfacing devices.
CO 5	Design new internet based applications by remote accessing mode.

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18PCSM401	CORE IX: PYTHON PROGRAMMING	SEMESTER- IV

Course Objectives:

- To acquire core concepts of Python.
- To collect knowledge on OOPs and System Programming.

To explore awareness about socket programming and web surfing.

Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Core Python:** Introduction- History of Python- Features of Python- Installing Python- Running Python-Input and output statements- Operators- Variables and Assignment- Numbers- Dictionaries-Control statements-Exceptions-Functions-Classes-Modules. **Syntax and Style:** Statements and Syntax- Variable Assignment- Identifiers.	10	CO1
II	**Python Objects:** Standard Types- Built-in Types- Standard Type Operators- Standard Type Built-in Functions. **Sequences:** Strings- Lists- Tuples. **Dictionaries:** Introduction to Dictionaries- Operators- Built-in Functions and methods- Dictionary Keys. **Conditionals and Loops:** if statement- else Statement- while Statement- for Statement- break Statement- continue Statement- pass Statement.	10	CO2
III	**Files and Input/Output:** File Objects- File Built-in Function,Methods and Attributes-Standard Files- Command-line Arguments- File System- File Execution. **Errors and Exceptions:** Detecting and Handling Exceptions- Standard Exceptions.	10	CO3
IV	**Functions:** Introduction- Calling Functions- Creating Functions- Passing Functions- Formal Arguments- Positional Arguments- Default Arguments- Variable-length Arguments- Functional Programming. **Modules:** Introduction- Modules and Files- Namespaces- Importing Modules- Importing Module Attributes- Module Built-in Functions.	10	CO4
V	**Network Programming:** Introduction- **Sockets:** Communication Endpoints- Network Programming in Python. **Web Programming:** Introduction- **Web Surfing with Python:** Creating Simple Web Clients- Advanced Web Clients- CGI: Helping Web Servers Process Client Data- Building CGI Application- Advanced CGI- Web (HTTP) Servers.	10	CO5

Text Book

1	*Wesley J. Chun* .2010. **Core Python Programming.** [First Edition]. Prentice Hall PTR. ISBN: 0-13-026036-3

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Reference Books	
1	*Mark Lutz*.2009. **Learning Python.**[Fourth Edition]. O Reily.ISBN: 978 - 0-596-15806-4
2	*Mark Lutz*.2010.**Programming Python.** [Fourth Edition].O Reily.ISBN:9780596158118
3	*Tim Hall and J-P Stacey*.2009. **Python 3 for Absolute Beginners.** ISBN:9781430216322
4	*Magnus Lie Hetland*.2009. **Beginning Python: From Novice to Professional.**[Second Edition]. ISBN:9781590599822.

Web References	
1	https://pythonprogramming.net/introduction-to-python-programming/
2	https://www.geeksforgeeks.org/python-programming-example/
3	https://www.python.org/

COURSE OUTCOMES (CO)

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

CO1	Realize the basic concepts of Python.
CO2	Know the OOPs and string handling techniques.
CO3	Analyze the file objects and automatic trigerring of programs.
CO4	Analyze the function handling and module description mechanisms.
CO5	Recognize the multiple end-users interaction in scripting and socket programming.

MAPPING

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

H-High; M-Medium; L-Low

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18PCSMP401	CORE PRACTICAL VII: PYTHON PROGRAMMING LAB	SEMESTER-IV

Course objectives:

The Course aims

- To implement OOPs concept in Python.
- To create webpages and explore database connectivity in Python.

Total Hours: 40

PROGRAM	CONTENTS	Hrs	CO
1	Programs using elementary data items, lists, dictionaries and conditional branches, loops.	04	CO1
2	Programs using functions	04	CO1
3	Programs using exception handling	04	CO2
4	Programs using classes and objects	04	CO2
5	Programs using inheritance	04	CO3
6	Programs using polymorphism	04	CO3
7	Programs to implement file operations.	04	CO4
8	Programs using modules.	04	CO4
9	Programs for creating dynamic and interactive web pages using forms.	04	CO5
10	Program using database connection and web services.	04	CO5

Web References

1	https://www.programiz.com/python-programming/examples
2	https://www.practicepython.org/
3	https://www.w3resource.com/python-exercises/

COURSE OUTCOMES (CO)

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

CO 1	Apply the elementary building blocks in Python program structure.
CO 2	Apply the OOPs concepts in Python programming.
CO 3	Realize and apply file handling operations in Python.
CO 4	Create customized web pages using forms in Python.
CO 5	Apply different types of database and web connectivity using Python.

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