

M. Sc.
INFORMATION TECHNOLOGY
SYLLABUS - 2018

SCHOOL OF EXCELLENCE
with
CHOICE BASED CREDIT SYSTEM (CBCS)



SCHOOL OF COMPUTING SCIENCES
St. JOSEPH'S COLLEGE (Autonomous)

Special Heritage Status Awarded by UGC
Accredited at 'A' Grade (3rd cycle) by NAAC
College with Potential for Excellence Conferred by UGC
DBT-STAR & DST-FIST Sponsored College
TIRUCHIRAPPALLI - 620 002, INDIA

SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)

POSTGRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to work towards the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from the academic year 2014-15, to standup to the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system allows the enhanced academic mobility and enriched employability of the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric in curriculum designing and skill imparting. These five schools will work concertedly to achieve and accomplish the following objectives.

- Optimal utilization of resources both human and material for the academic flexibility leading to excellence.
- Students experience or enjoy their choice of courses and credits for their horizontal mobility.
- The existing curricular structure as specified by TANSCH and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice-based credit system.
- Human excellence in specialized areas
- Thrust in internship and / or projects as a lead towards research and
- The multi-discipline nature of the newly evolved structure (School System) caters to the needs of stake-holders, especially the employers.

What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally, one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses, a student must earn a minimum of 110 credits as mentioned in the table below. The total number of minimum courses offered by a department are given in the course pattern.

POSTGRADUATE COURSE PATTERN (June 2018 onwards)

Part	Semester	Specification	No. of Courses	Hours	Credits	Total Credits
1	I-IV	Core Courses Theory Practical	12-14 3-6	84	68	81
	II	Self-Paced Learning	1	-	2	
	III	Interdisciplinary Core	1	6	5	
	IV	Comprehensive Examination Project Work	1 1	- 6	2 4	
2	I-III	Core Electives	3	12	12	12
3	II	IDC (Soft Skills)	1	4	4	12
	III	IDC (WS) IDC (BS)	1 1	4 4	4 4	
4	I	Extra Credit Courses-1 (MOOC)	1	-	(2)	(4)
	III	Extra Credit Courses-2 (MOOC)	1	-	(2)	
5	IV	Outreach Programme (SHEPHERD)	1	-	5	5
		TOTAL		120		110 (+4 extra credits)

Note: IDC: Inter-Departmental Courses, BS: Between School, WS: Within School

However, there could be some flexibility because of practical, field visits, tutorials and nature of project work. For PG courses, a student must earn a minimum of 110 credits. The total number of courses offered by a department is given above.

Course Pattern

The Post-Graduate degree course consists of five vital components. They are core course, core electives, IDCs, Extra credit courses, and the Outreach Programme.

Core Courses

A core course is the course offered by the parent department related to the major subjects, components like theories, practicals, Inter disciplinary core, self paced learning, comprehensive examination, Project work, field visits, library record and etc.

Inter-disciplinary Core

Inter-disciplinary Core should be shared by the various Departments of every School. This course should be opted by all the students belonging to the particular school. Each department of the respective school should allocate themselves the schedule and the units of the course.

Core Elective

The core elective course is also offered by the parent department. The objective is to provide choice and flexibility within the department. There are three core electives. They are offered in different semesters according to the choice of the school.

Extra Credit Courses

In order to facilitate the students gaining extra credits, the extra credit courses are given. According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Inter-Departmental Courses (IDC)

IDC is an interdepartmental course offered by a department / School for the students belonging to other departments / school. The objective is to provide mobility and flexibility outside the parent department / School. This is introduced to make every course multi-disciplinary in nature. It is to be chosen from a list of courses offered by various departments.

There are three IDCs. Among three, one is the Soft-Skill course offered by the JASS in the II Semester for the students of all the Departments. The other one is offered "With-in the school" (WS) and the third one is offered "Between the school" (BS). The IDCs are of application oriented and inter disciplinary in nature.

Subject Code Fixation

The following code system (9 characters) is adopted for Post Graduate courses:

Year of Revision	PG Code of the Dept	Semester	Specification of Part	Running number in the part
↓	↓	↓	↓	↓
18	P##	x	x	xx
18	PIT	1	1	01

For Example :

MSc - Information Technology, first semester 'Database Systems'

The code of the paper is **18PIT1101**.

Thus, the subject code is fixed for other subjects.

Specification of the Part

- I - Core Courses: (Theory, Practical, Self paced Learning, Inter-disciplinary Core, Core, Comprehensive Examination, Project work)
- II - Core Electives
- III - Inter Departmental Courses (WS, Soft Skill & BS)
- IV - Extra credit courses
- V - Outreach Programme (Shepherd)

EXAMINATION

Continuous Internal Assessment (CIA):

PG - Distribution of CIA Marks	
Passing Minimum: 50 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
CIA	100

Mid-Semster & End-Semester Tests

Centralised – Conducted by the office of Controller of Examinations

1. Mid-Semester Test & End-Semester Test: (2 Hours each); will have Objective + Descriptive elements; with the existing question pattern PART-A; PART-B; and PART-C
2. CIA Component III for UG & PG will be of 15 marks and compulsorily objective multiple choice question type.
3. The CIA Component III must be conducted by the department / faculty concerned at a suitable computer centres.
4. The 10 marks of PART-A of Mid-Semester and End-Semester Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS; TRUE / FALSE; and FILL-IN BLANKS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.
6. English Composition once a fortnight will form one of the components for UG General English

SEMESTER EXAMINATION

Testing with Objective and Descriptive questions

Part-A: Objective MCQs only (30 Marks)

Answers are to be marked on OMR score-sheet. The OMR score-sheets will be supplied along with the Main Answer Book. 40 minutes after the start of the examination the OMR score-sheets will be collected

Part-B & C: Descriptive (70 Marks)

Part-B: 5 x 5 = 25 marks; inbuilt choice;

Part-C: 3 x 15 = 45 marks; 3 out of 5 questions, open choice.

The Accounts Paper of Commerce will have

Part-A: Objective = 25 marks

Part-B: 25 x 3 = 75 marks

Duration of Examination must be rational; proportional to teaching hours
90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

GRADING SYSTEM

1. Grading

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added. The marks thus obtained, will then be graded as per the scheme provided in the following Table-1.

From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by Semester **Grade Point Average (GPA)** and **Cumulative Grade Point Average (CGPA)** respectively. These two are calculated by the following formulae:

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad \text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$$

where,

'C_i' is the Credit earned for the Course-*i*,

'G_i' is the Grade Point obtained by the student for the Course '*i*',

'M' is the marks obtained for the course '*i*', and

'n' is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

2. Classification of Final Results

- The classification of final results shall be based on the CGPA, as indicated in the following Table-2.
- For the purpose of Classification of Final Results, the candidates who earn the CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly, the candidates who earn the CGPA between 8.00 and 8.99, 7.00 and 7.99, 6.00 and 6.99, and 5.00 and 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good', and 'Above Average' respectively.
- Absence from an examination shall not be taken as an attempt.

Table-1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
Below 50	NA	RA

Table-2: Final Result

CGPA	Classification of Final Results	Corresponding Grade
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
Below 5.00	RA	Re-appearance

Credit based weighted Mark System is to be adopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).

A Pass in Outreach Programme (SHEPHERD) will continue to be mandatory although the marks will not count for the calculation of the CGPA.

Declaration of Result:

Mr./Ms. _____ has successfully completed the Post Graduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) is _____ and the class secured _____ by completing the minimum of 110 credits.

The candidate has also acquired _____ (if any) extra credits offered by the parent department courses.

M.Sc. INFORMATION TECHNOLOGY

Course Pattern - 2018 Set

Sem.	Code	Course	Hr	Cr
I	18PIT1101	Programming in Java	5	4
	18PIT1102	Database Systems	5	4
	18PIT1103	Cloud and Fog Computing	5	4
	18PIT1104	Introduction to IoT	5	4
	18PIT1105	Software Lab-I: (JAVA)	3	2
	18PIT1106	Software Lab-II: (RDBMS)	3	2
	18PIT1201A	Core Elective-I: Software Engineering (or)	4	4
	18PIT1201B	Core Elective-I: Web Services with JSON		
	18PIT1401	Extra Credit Course-I: MOOC	-	(2)
Total for Semester-I			30	24+2
II	18PIT2107	Online Course: Web Design and PHP	5	4
	18PIT2108	IoT Programming	5	4
	18PIT2109	Software Lab-III: (Web Design and PHP)	3	2
	18PIT2110	Software Lab-IV: (IoT Programming)	3	2
	18PIT2202A	Core Elective-II: Information Security (or)	4	4
	18PIT2202B	Core Elective-II: Real Time Operating System		
	18PIT2111	Self-paced Learning: Mobile Communications	-	2
	18PSS2301	IDC: Soft Skills	4	4
	18PIT2301	IDC (WS): Computer Generated Imagery	4	4
	18PIT2112	PC Trouble Shooting	2	1
Total for Semester-II			30	27
III	18PIT3113	Online Course: Big Data Analytics	5	4
	18PIT3114	Java Script Programming on Things	5	4
	18SCS3101B	Inter-Disciplinary Core: Mobile Application Development using Android	6	5
	18PIT3115	Software Lab-V (IoT Programming using Java Script)	3	2
	18PIT3116	Software Lab-VI (Android)	3	2
	18PIT3203A	Core Elective-III: High Performance Computing (or)	4	4
	18PIT3203B	Core Elective-III: Intelligent Networks		
	18PIT3302	IDC (BS): Web Design and Content Management System	4	4
	18PIT3117	Mini Project (During II-Semester Vacation)	-	7
	18PIT3118	Comprehensive Examination	-	2
	18PIT3402	Extra Credit Course-II: MOOC	-	(2)
Total for Semester III			30	34+2
IV	18PIT4119	Project Work	30	20
	Total for Semester IV		30	20
	16PCW4501	Outreach Programme (SHEPHERD)	-	5
Total for All Semesters			120	110+(4)

Programme Outcomes (POs):

1. Graduates are prepared to be creators of new knowledge leading to innovation, entrepreneur and employable in various sectors such as Private, Government and Research organizations.
2. Graduates are trained to evolve/ adopt new technologies in their own discipline.
3. Graduates are groomed to engage in lifelong learning process by exploring knowledge independently
4. Graduates are framed to design and conduct experiments/ demonstrate/ create models to analyze and interpret data.
5. Graduates ought to have the ability of effectively communicating the findings of Biological Sciences/Computing Sciences/ Languages and Culture/ Management Studies/ Physical Sciences/ and to incorporate with existing knowledge.

Programme Specific Outcomes (PSOs):

1. Fundamental knowledge in problem solving, general computing, and in depth knowledge in Information Technology.
2. An ability to identify, analyze, design, optimize and implement system solutions using suitable computing techniques leading to propulsion towards employability.
3. An ability to understand and provide solutions to real life problems in Internet of Things with thrust in lifelong learning.
4. Fundamental knowledge in computational methods and tools for solving realtime problems.
5. An ability to act as a leader, or as a part of a team to create multi-functional software products
6. An Ability to demonstrate individual practical experiences in a variety of programming languages and situations.

Semester I
18PIT1101

Hours/Week: 5
Credits : 4

PROGRAMMING IN JAVA

Course Outcomes:

1. Develop solutions for a range of problems using object-oriented programming.
2. Solve simple problems using the fundamental syntax and semantics of the Java Programming language
3. Use the Java event-handling model to respond to events arising from the GUI Components.
4. Acquire knowledge of thread and JDBC programming techniques in Java.
5. Understand and implement advanced concepts of java like Networking and RMI
6. Demonstrate the ability to learn java concepts Servlet and Cookies.

Unit-I:

13 hr

CLASSES AND OBJECTS: General Form of A Class - Creation of Objects - Usage of Constructors - 'this' Keyword- Constructor Overloading-Copy Constructors-Static Data Members - Static Methods- Finalize Method. INHERITANCE AND POLYMORPHISM: Inheriting Variables in a Class - Inheriting Methods in a Class - Inheritance and Constructors Abstract Classes - Final Classes.

Unit-II:

13 hr

INTERFACES AND PACKAGES: Interfaces-Structure of an Interface - Implementation of an Interface Inheritance. Packages - Placing the Classes in a Package - Package Hierarchy Access Control Modifiers. APPLETS: The Life Cycle of an Applet -The Applet Class Development and Execution of a Simple Applet - Syntax Of Applet Tag- Methods in the Graphic Class.

Unit-III:

13 hr

SWING:JApplet class - Icons - JLabel Control - JOptionPane Class - JTextField Control JButton Control - JCheckBox Control - JRadioButton Control Menus. EXCEPTION HANDLING: Default Exception Handling - Exception and Error Classes - Catch Block Searching Pattern - Custom Exceptions. I/O STREAMS: Text And Binary Formats of Data Input Stream and Output Stream Classes - Reader and Writer Classes - Data Output Stream and Data Input Stream Classes.

Unit-IV:

13 hr

THREADS: Life Cycle Of A Thread - Creating And Running Threads - Method In The Thread Class - Setting The Priority Of A Thread - Synchronization. NETWORKING:TCP Server Socket Class - TCP Socket Class.JAVA DATABASE CONNECTIVITY: Establishing a Connection - Creation Of Data Tables Entering Data Into The Tables - Table Updating.

Unit-V:

13 hr

REMOTE METHOD INVOCATION : Remote Interface-Java.Rmi.Server Package The Naming Class - Creating RMI Client And Server Classes. SERVLET: Servlet and Dynamic Webpages Life Cycle of a Servlet a Simple Servlet javax.Servlet Package Retrieving the Values Of Parameters. COOKIES: Creating a Cookie and Sending it to the Client – Retrieving the Stored Cookies.

Textbook

1. C. Muthu, "Programming with JAVA", Vijay Nicole Imprints Private Limited, 2nd Edition, Chennai, 2011

Book for Reference

1. Herbert Schildt, "Java 2: Complete Reference", Tata McGraw Hill, 5th Edition, 2009

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1101	Title of the Paper PROGRAMMING IN JAVA										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3	2	4	4	4	3	3	2	3	5	3.3	
CO2	4	4	2	3	4	3	3	5	2	4	5	3.5	
CO3	4	3	2	3	4	2	4	1	3	5	5	3.2	
CO4	5	2	2	2	4	3	3	5	2	4	5	3.3	
CO5	5	2	3	2	4	2	3	5	3	4	5	3.4	
CO6	5	3	2	3	4	3	4	5	3	4	5	3.7	
Overall Mean Score for COs												3.4	

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs =	Total of Values	Mean Overall Score for COs =	Total of Mean Scores
	$\frac{\text{Total No. of POs \& PSOs}}{\text{Total No. of COs}}$		$\frac{\text{Total No. of COs}}{\text{Total No. of COs}}$

**Semester I
18PIT1102**

**Hours/Week: 5
Credits : 4**

DATABASE SYSTEMS

Course Outcomes:

1. Understand relational database theory and be able to use a relational database management system.
2. Understand the relational model and relational algebra operations.
3. Able to use SQL commands to create, manipulate, and query databases.
4. Able to apply proper techniques, such as normalization, in designing a database.
5. Understand and apply the concept of PL/SQL
6. Understand the parallel and distributed data base systems.

Unit-I:

13 hr

INTRODUCTION TO DBS: Basic Concepts and Definitions. DATABASE SYSTEM ARCHITECTURE: Schemas, Sub- schemas and Instances - Data Models - Types of Data base Systems. RELATIONAL ALGEBRA AND CALCULUS: Structure - Relational Algebra - Relational Calculus.

Unit-II:

13 hr

RELATIONAL QUERY LANGUAGES: Introduction - Codd's Rules - Information System Based Language - Structured Query Language (SQL) - Embedded SQL.

Unit-III:

13 hr

FUNCTIONAL DEPENDENCY AND DECOMPOSITION: Functional Dependency – Decomposition. NORMALIZATION: Normalization - Normal Forms - BCNF - Multi-valued Dependencies and Fourth Normal Form and Join Dependencies and Fifth Normal Forms.

Unit-IV:

13 hr

PL/SQL: History - Fundamentals -Data types - Operators - Control Structures - Nested Blocks - SQL in PL/SQL - Data Manipulation - Transaction Control Statements - PL/SQL Cursors and Exceptions. NAMED BLOCKS: Procedures - Functions - Packages -Triggers.

Unit-V:

13 hr

TRANSACTION PROCESSING AND CONCURRENCY CONTROL: Transaction Concepts – Concurrency Control – Locking methods for Concurrency Control. PARALLEL DATABASE SYSTEMS: Introduction to

Parallel Databases - Architecture of Parallel Databases - Key Elements of Parallel Database Processing. DISTRIBUTION DATABASE SYSTEMS: Distributed Databases - Architecture of Distributed Databases - Distributed Database design.

Textbooks

1. S K Singh, “Database Systems Concepts, Design and Applications”, Pearson Education, 2006. Units: I, II, III & V
2. Nilesh Shah, “Database Systems using ORACLE”, Prentice Hall of India, 2005. Unit: IV

Books for Reference

1. Abraham Silberschatz, “Database Systems”, McGraw Hill International, 1997.
2. CJ Date, “An Introduction to Database Systems”, 6th Ed., Addison Wesley Publishing Company, New York, 1995.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1102	Title of the Paper DATABASE SYSTEMS										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
	4	4	4	4	4	4	4	4	4	4	4		
	4	4	3	4	4	4	4	4	4	4	4		
	4	3	4	4	4	4	4	4	4	3	4		
	4	4	4	4	4	4	4	3	4	4	4		
	4	4	3	4	4	4	3	4	4	4	4		
	4	4	4	3	4	4	4	4	4	4	4		
Overall Mean Score for COs												3.8	

Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$		Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$	
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Semester I
18PIT1103

Hours/Week: 5
Credits : 4

Core Elective-I:
CLOUD & FOG COMPUTING

Course Outcomes:

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing and apply suitable virtualization concept.
3. Ability to discern and appropriate Cloud Providers.
4. Recognize the Energy Efficient and Market Oriented Cloud models.
5. Comprehend the need of Fog Computing in integrating IoT with Cloud.
6. Personalize Real World Problems using Fog and IoT.

Unit-I: **10 hr**

Introduction: Cloud Computing at a Glance - Historical Developments – Building Cloud Computing Environments – Computing Platforms and Technologies. Virtualization : Introduction – Characteristics of Virtualized Environments – Taxonomy of Virtualization Techniques – Virtualization and Cloud Computing – Pros and Cons of Virtualization – Technology Examples.

Unit-II: **10 hr**

Cloud Computing Architecture: Cloud Reference Model – Types of Clouds – Economics of the Cloud. Cloud Platforms in Industry: Amazon Web Services: Compute Services – Storage Services – Communication Services – Additional Services. Google AppEngine: Architecture and Core Concepts – Application Life Cycle – Cost Model. Microsoft Azure: Azure core Concepts – SQL Azure.

Unit-III: **10 hr**

Advanced Topics in Cloud Computing: Energy Efficiency in Clouds. Market Based Management of Clouds: Market-Oriented Cloud Computing – A Reference Model for MOCC – Technologies and Initiatives supporting MOCC. Federated Clouds / Inter Cloud: Characterization and Definition – Cloud Federation Stack – Aspects of Interest – Technologies for Cloud Federations.

Unit-IV: **10 hr**

Fog Computing Fundamentals: Introduction – Background and Motivation of Fog Computing – Fog Computing Basics – Fog Computing Services. IoT Resource Estimation Challenges and Modeling in Fog: Fog Resource

estimation and its challenges. Self-aware Fog Computing in Private and Secure Sphere: Cloud, Fog and Mist Computing Networks- Self-aware Data Processing - Case study: Health monitoring – Patient Safety monitoring and training support – Smart house.

Unit-V: **10 hr**

Urban IoT Edge Analytics: Design challenges – Edge-assisted Architecture – Information Acquisition and Compression – Content-aware wireless networking – Information availability. Leveraging Fog Computing for Healthcare IoT: Introduction – Healthcare Services in the Fog Layer – Data management – Event Management – Resource Efficiency – Device management – personalization – Privacy and Security – System Architecture of Healthcare IoT – Case study.

Textbooks

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, “Mastering Cloud Computing”, McGraw Hill Education (India) Private Limited Publications, First Reprint, 2013. Units I, II, III
2. Amir M. Rahmani, Pasi Liljeberg, Preden, Axel Jantsch, “Fog Computing in the Internet of Things - Intelligence at the Edge”, Springer International Publishing, 2018. Units IV, V

Books for Reference

1. Michael Miller, “Cloud Computing Web Based Applications that change the way you work and collaborate online”, Pearson Education, 2009.
2. Evangelos Markakis, George Mastorakis, Constandinos X, Mavromoustakis and Evangelos Pallis, “Cloud and Fog Computing in 5G Mobile Networks: Emerging advances and Applications”, The Institution of Engineering and Technology, 2017.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1103	Title of the Paper CLOUD & FOG COMPUTING										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	3	4	4	3	3	4	3	3	2	4	3.27	
CO2	4	3	3	4	3	4	4	4	4	2	2	3.36	
CO3	4	3	3	4	4	3	4	3	4	2	4	3.45	
CO4	5	3	4	5	4	4	4	4	3	3	4	3.91	
CO5	4	3	3	4	4	3	4	4	4	2	4	3.55	
CO6	4	3	2	4	4	3	4	3	4	2	3	3.27	
Overall Mean Score for COs												3.46	

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester I
18PIT1104**

**Hours/Week: 5
Credits : 4**

INTRODUCTION TO IoT

Course Outcomes:

1. Understand the Architectural Overview of IoT.
2. Realize the concepts of IoT using Wireless Technologies.
3. Understand the various IoT Protocols.
4. Impart the knowledge on the devices of IoT.
5. Comprehend the idea of M2M.
6. Learn the IoT security in various domains.

Unit-I:

13 hr

INTRODUCTION TO INTERNET OF THINGS: Introduction - Physical design of IoT – Logical design of IoT – IoT Enabling Technologies – IoT levels & Deployment technologies.

DEMYSTIFYING THE IoT PARADIGM: The Emerging IoT flavors-The Industrial Internet of Things – Consumer Internet of Things - Social Internet of things - Semantics for The Interoperable IoT- Cognitive IoT.

Unit-II:

13 hr

REALIZATION OF IoT ECOSYSTEM USING WIRELESS TECHNOLOGIES: Introduction- Architecture for IoT Using Mobile Devices- Mobile Technologies for Supporting IoT Ecosystem- Mobile Use Cases for IoT – Low Power Wide Area Networking Topologies – Sigfox- Weightless – Nwave- Ingenu- Lora.

Unit-III:

13 hr

INFRASTRUCTURE AND SERVICE DISCOVERY PROTOCOLS FOR THE IOT ECOSYSTEM: Introduction- Layered Architecture for IoT – Protocol Architecture of IoT – Infrastructure Protocols-Device or Service Discovery for IoT – Protocols for IoT service Discovery.

INTEGRATION TECHNOLOGIES AND TOOLS FOR IOT ENVIRONMENTS: Sensor and actuator networks.

Unit-IV:

13 hr

IOT AND M2M: INTRODUCTION – M2M – Difference Between IoT and M2M – SDN and NFV for IoT. DEVELOPING IOT: IoT Design Methodology.

Unit-V:

13 hr

SECURITY MANAGEMENT OF AN IOT ECOSYSTEM: Introduction- Security Requirements of an IOT Infrastructure-Authentication,

Authorization And Audit Trail (AAA) Framework-Defense In Depth-Security Concerns of Cloud Platforms-Security Threats of Big Data –Security Threats In Smartphones-Security Solutions For Mobile Devices-Security Concerns In IoT Components-Security Measures for IoT Platforms/Devices.

Textbooks

1. Pethuru Raj and Anupama C. Raman, “The Internet of Things Enabling Technologies, Platforms, and Use Cases”, Taylor & Francis, CRC Press, 1st Edition, 2017.
2. Arshdeep Bahga, Vijay Madisetti, “Internet of Things, A Hands-On Approach”, Universities Press (INDIA) Private Limited, 1st Edition, 2015.

Books for Reference

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1104	Title of the Paper INTRODUCTION TO IoT										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	3	4	4	3	4	3.7	
CO2	4	4	4	3	4	3	4	4	4	4	3	3.7	
CO3	3	4	4	4	3	4	4	3	4	4	4	3.7	
CO4	4	4	4	4	3	4	3	4	4	4	3	3.7	
CO5	4	4	4	4	4	4	3	3	4	4	3	3.7	
CO6	4	4	4	4	4	3	4	4	3	3	4	3.7	
Overall Mean Score for COs												3.7	

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester I
18PIT1105

Hours/Week: 3
Credits : 2

Software Lab-I:
JAVA

Course Outcomes:

1. Demonstrate the basic concepts of OOPS
2. Implement the programming skills based on OOPS
3. Demonstrate the behavior of Exception handling and Multithreading
4. Implement the concept of GUI (Event handling, Applet and Swing).
5. Develop programming aspect with files and networking.
6. Apply the concept of JDBC to develop connection with database.

List of Practical Exercises

1. Classes & Objects
2. Packages & Interfaces
3. Inheritance
4. Exception Handling
5. Multithreading
6. Applet
7. Swing
8. Event Handling Mechanisms
9. Streams and Files
10. Networking
11. JDBC
12. Java Beans

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1105	Title of the Paper Software Lab-I: JAVA										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3	2	4	4	4	3	3	2	3	5	3.3	
CO2	4	4	2	3	4	1	3	5	2	4	4	3.2	
CO3	4	3	2	3	4	2	4	1	3	5	5	3.2	
CO4	5	2	2	2	4	1	3	5	2	4	5	3.1	
CO5	5	5	1	3	4	2	4	1	3	4	5	3.3	
CO6	5	3	2	3	4	4	1	3	5	2	5	3.3	
Overall Mean Score for COs												3.3	

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Software Lab-II:
RDBMS**

Course Outcomes:

1. Populate and query a database using DML/DDDL commands.
2. Design a table and apply aggregate function and set operations.
3. Normalize the database using normalization rules.
4. Apply PL/SQL for query processing.
5. Design nested sub queries and correlated sub queries for a given problem.
6. Use PL/SQL stored procedure, stored functions, cursors and packages to query the database.

List of Practical Exercises

SQL

1. Simple Queries using DDL, DML, and DCL
2. SQL Functions
3. SET Operations
4. View and Snapshots
5. Nested Queries

PL/SQL

6. PL/SQL Block
7. Cursors
8. Database Triggers
9. Subprograms and Packages.

FORMS AND REPORTS

10. Designing Oracle Forms with Menus, Buttons and LOVs
11. Master-Detail Form Design.
12. Developing Oracle Reports (Tabular, Master / Detail, Matrix and Mailing label)

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1106	Title of the Paper Software Lab-II: RDBMS										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO2	4	4	4	4	4	3	4	4	4	4	4	3.9	
CO3	4	4	3	4	4	4	4	4	4	4	4	3.9	
CO4	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO5	3	4	4	4	4	4	4	4	4	4	3	3.8	
CO6	4	4	4	4	4	3	4	4	4	4	3	3.8	
Overall Mean Score for COs												3.9	

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester I
18PIT1201A

Hours/Week: 4
Credits : 4

SOFTWARE ENGINEERING

Course Outcomes:

1. Basic understanding of software engineering, terminologies, various process models.
2. Learn the importance of software requirement specification and requirement engineering tasks.
3. Understand the relationship between estimation, scheduling and modularity of a software system.
4. Understand and apply the concept of software metrics and project planning
5. Impart the knowledge in testing strategies and techniques
6. Fundamental knowledge of functional testing and cause effect graphing.

Unit-I:

10 hr

SOFTWARE ENGINEERING : Introduction – Some Terminologies – Role of Management in Software Development – SDLC Models – Build and Fix, Waterfall, Prototyping, Iterative Enhancement, Evolutionary Developing, Spiral, RAD Model – Selection of Life Cycle Model.

Unit-II:

10 hr

SOFTWARE REQUIREMENTS ANALYSIS & SPECIFICATIONS: Requirement Engineering - Type of Requirements – Feasibility Studies - Requirement Elicitation

Techniques like FAST & QFD- Requirements Analysis using DFD(with case studies) - Data Dictionaries & ER Diagrams, Requirements Documentation - Nature of SRS - Characteristics & Organization of SRS – Example.

Unit-III:

10 hr

SOFTWARE PROJECT PLANNING: Size Estimation models -Cost Estimation Models - COCOMO - Putnam Resource Allocation Model - Risk Management. SOFTWARE DESIGN: Modularity - Cohesion & Coupling, Classification of Cohesiveness & Coupling- Function Oriented Design, Object Oriented Design.

Unit-IV:

10 hr

SOFTWARE METRICS: Introduction - Data Structure Metrics- Information Flow Metrics.

SOFTWARE RELIABILITY: Basic concepts – Software Quality - CMM.

Unit-V:

10 hr

SOFTWARE TESTING: A Strategic Approach to Software Testing – Terminologies - Functional Testing: Boundary Value Analysis - Equivalence Class Testing - Decision Table

Testing- Cause Effect Graphing- Structural Testing- Path Testing -Data Flow and Mutation Testing - UNIT Testing- Integration and System Testing- Validation Testing – The Art of Debugging- Testing Tools.

Textbook

1. K. K. Aggarwal, Yogesh Singh, “Software Engineering”, New Age International Publications, 3rd Edition, New Delhi, 2009.

Books for Reference

1. Ian Sommerville, “Software Engineering”, Pearson Education Asia, 6th Edition, 2002.
2. Roger S. Pressman, “Software Engineering. A Practitioner’s Approach”, 7th Edition, McGraw Hill, New Delhi 2009

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Code 18PIT1201A	Title of the Paper Core Elective-I: SOFTWARE ENGINEERING										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	3	4	3	3	4	3	3	4	4	3.6	
CO2	4	3	4	4	4	4	4	3	4	4	3	3.7	
CO3	4	4	4	4	4	4	4	4	3	4	4	3.9	
CO4	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO5	4	4	4	4	3	4	4	3	4	4	4	3.8	
CO6	4	4	4	4	3	4	4	3	4	4	4	3.8	
Overall Mean Score for COs												3.8	

Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester I
18PIT1201B**

**Hours/Week: 4
Credits : 4**

Core Elective-II: WEB SERVICES WITH JSON

Course Outcomes:

1. Able to develop the aptitude skills.
2. Able to boost the logical thinking by reasoning.
3. Comprehend the basic knowledge in C, C++ and Java.
4. Examine their technical skills by debugging the programs.
5. Able to compete in the competitive exams and interviews
6. Understand the concepts of UDDI and SOAP in WSDL

Unit-I:

10 hr

INTRODUCTION TO XML: An Eagle Eye View of XML - XML Definition - Life of an XML Document - Related Technologies.

STRUCTURING THE DATA: Examining the Data - XMLizing the Data - Advantages of the XML format - Preparing a Style Sheet for Document Display.

ATTRIBUTES, EMPTY TAGS AND XSL: Attributes - Attributes Vs Elements - Empty Tags.

XSL WELL FORMEDNESS: Well Formed Rules - XML Documents - Text in XML - Processing Instructions.

Unit-II:

10 hr

JSON: Getting Started with JSON – JSON Syntax – JSON Datatypes – Introduction to JSON Schema – Client Side Frameworks – Serializing , Deserializing and Requesting JSON

Unit-III:

10 hr

WEB SERVICES: Concepts of Web Services - SOAP, WSDL, UDDI - Importance of Web Services - Evolution of Web Applications – Distributed Computing Platform - Web Services and Enterprises.

Unit-IV:

10 hr

BASIC WEB SERVICES STANDARDS, TECHNOLOGIES AND CONCEPTS: SOAP Model - SOAP - SOAP Messages - SOAP Encoding - SOAP RPC - Using Alternative SOAP Encodings - Document, RPC, Literal , Encoded SOAP.

Unit-V:**10 hr**

UDDI: UDDI at a Glance - UDDI Business Registry - Accessing UDDI.
WSDL: WSDL using SOAP and UDDI.

Textbooks

1. Elliotte Rusty Harold, “XML Bible”, IDG Books India, 1st Edition, New Delhi, 2004. Unit: I
2. Lindsay Bassett, “Introduction to JavaScript Object Notation”, O’ Reilly Media, 1st Edition California, 2015. Unit: II
3. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services - An Architect’s Guide”, PHI, 1st Edition, New Delhi, 2003. UNITS: III, IV and V

Books for Reference

1. Gold forb, “XML hand book”, Pearson Education, New Delhi, 2003.
2. B V Kumar, S V Subramanya, “Web Services: An Introduction”, Tata McGraw Hill Publishing Co., New Delhi, 2006.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester	Code	Title of the Paper										Hours	Credits
I	18PIT1201B	Core Elective-I: WEB SERVICES WITH JSON										4	4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
	4	4	4	4	4	4	4	4	4	4	4		
CO1	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO2	4	4	4	3	4	3	4	4	4	4	4	3.8	
CO3	4	4	4	4	3	4	4	3	4	4	4	3.8	
CO4	4	4	4	4	3	4	3	4	4	4	4	3.8	
CO5	4	4	4	3	4	4	4	3	4	4	4	3.8	
Overall Mean Score for COs												3.9	

Result: The Score for this Course is 3.9 (High Relationship)*Note:*

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester II
18PIT2107

Hours/Week: 5
Credits : 4

Online Course:
WEB DESIGN & PHP

Course Outcomes:

1. Understand fundamental concepts of design web forms
2. Study various styles using cascading style sheets
3. Demonstrate the creation of dynamic web pages
4. Understand the nuances of PHP Programming
5. Understand avoid and Handle errors in PHP pages
6. Understand the structure of MYSQL

Total Hours:

60 Hours (Discussion – 36 + Outside – 24)

Intended for:

Any PG students with Computer Science Background

Prerequisite:

Students should know fundamentals of Internet and WWW

Course Content :

E-Contents will be available online

Module Description	Discussion Hours	Outside Hours	Module Objective	Learning Outcome
Module I: HTML • Basic Tags • New Elements in HTML5 • Tables • Form Controls and Validation	6	4	To understand how to design web pages using HTML5 elements	a) Design Web pages b) Learn how to design Web Forms c) Perform basic validations of the forms
Module II: CSS • CSS Introduction • CSS Styling • CSS Box Model • CSS Advanced	6	4	To understand how to apply styling for the web forms	a) Apply Style information to the Web forms b) Apply Advanced CSS concepts like bootstrap and Lightbox
Module III: Java Script • Basics of JavaScript • DOM • Events and Listeners • JavaScript Libraries • JQuery Basics	6	4	To understand how to make the web pages interactive and dynamic	a) Learn how to create Dynamic web pages b) Learn how to use jQuery for interactive web pages

Module Description	Discussion Hours	Outside Hours	Module Objective	Learning Outcome
Module IV: PHP • PHP Introduction • PHP Programming Concepts • PHP Functions • Sending Mail using PHP • Image Uploading • Handling Errors	10	7	To understand the fundamentals of PHP programming	a) Understand the nuances of PHP Programming b) Able to know how to send mail and Image Uploading c) Avoid and Handle errors in PHP pages
Module V: PHP with MySQL • MySQL Structure and Syntax • Connecting to MySQL Server • Querying the database • Creating Master - Child Relationship	8	5	To understand database operations by using MySQL	a) Understand the structure of MySQL database b) Perform Basic database operations

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2107	Title of the Paper WEB DESIGN & PHP (Online Courses)										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3	4	4	4	3	4	4	4	4	4	3.8	
CO2	4	4	4	4	3	4	4	4	3	4	4	3.8	
CO3	4	4	4	3	4	4	4	4	3	4	3	3.7	
CO4	4	4	4	3	4	3	4	4	4	4	4	3.8	
CO5	3	4	4	4	4	3	3	4	4	4	4	3.7	
CO6	4	3	4	4	4	3	4	3	4	4	4	3.7	
Overall Mean Score for COs												3.7	

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1	2	3	4	5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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IoT PROGRAMMING

Course Outcomes:

1. Understand the concept of software specifications
2. Understand about the basics of Pi 3 operating system
3. To Learn the operate your Pi 3 using different interfaces
4. Gain knowledge of install to different packages on Pi.
5. Learn various types of LED circuits.
6. Gain knowledge of project and testing

Unit-I

13 hr

INTRODUCTION: Raspberry - Raspberry Pi's part - Pi a cozy home: Pi - The brain of Pi system on a chip -Connecting a keyboard and mouse: USB- Storing memories Pi gets a memory card -Connecting a TV or monitor: HDMI - Other ports and-connections -Powering your Pi: micro USB power. SOFTWARE SPECIFICATIONS: Getting Pi running software -Installing the Raspbian operating system -Configuring the operating system - Saving configuration and rebooting -Getting around: learning Raspbian- Finding and opening applications on Raspberry Pi 26.

Unit-II

13 hr

EXPLORING PYTHON: Playing with Python -Discovering Python's mathematical operators -Adding and subtracting - Multiplying and dividing -Figuring out whole numbers and remainders - Exponents - Square roots – VARIABLES: stacking- Storing information using variables - Creating variables and assigning values – Displaying variable values -Storing strings in variables -Changing the value of variables.

Unit-III

13 hr

CONTROL STATEMENTS: Using if statements to respond to users in different ways -Practicing if statements -Using while loops to repeat things -A closer look at while loops - Breaking out of a while loop - Practicing while loops. SIMPLE PROGRAMS: Displaying text on a screen -Using the print function - Creating programs -Writing Python programs with IDLE -Starting a new program -Saving programs - Python interpreting the program -Fruit Picker Extra.

Unit-IV

13 hr

RASPI'S CAVE ADVENTURE: Raspi's Cave Adventure-Left caves -Right cave- need a plan -Handling unexpected input - Finishing the left cave -

Exploring the right caves -Troubleshooting. Random demise - Setting up the Pi for physical computing -GPIO pins - Breaking out the GPIO pins to a breadboard - Breadboard basics .LED CIRCUIT: Building the LED circuit - Connect the jumper from GPIO pin 21- Add the red LED - Connect a resistor –Software blink LED program -Running the program – blink LED -Adding more LEDs-Building the circuit Multiple LED.

Unit-V

13 hr

PROJECT OVERVIEW: Pi to play sounds-OMX Player and MP3s 208- hardwarebuilding the circuit - Wiring a button - Circuit sketch - Adding the second button -Software the DJ Raspi program -Setting up the Pi: initializing the buttons -Getting a list of sounds - Getting a value of an item stored in a list - Getting the length of a list -Building a list of sound files with the os library - Playing a sound when a button is pressed. TESTING: gig as DJ Raspi –Trouble .shooting.

Textbook

1. Ryan Heitz," Hello Raspberry Pi! Python programming for kids and other beginners", United States of America by Manning Publications Co,2016.

Books for Reference

1. Jason Scotts," Raspberry programming genius", kindle edition, 2013.
2. Leonard Eddison,"Raspberry Pi & Python: Step By Step Guide from Beginner to Advanced", kindle edition, 2014.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2108	Title of the Paper IoT PROGRAMMING										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	4	5	3	4	4	4.0	
CO2	4	4	4	4	4	4	4	5	3	4	3	3.9	
CO3	4	4	4	3	4	4	4	5	3	4	4	3.9	
CO4	4	4	4	4	4	4	4	5	4	4	4	4.0	
CO5	4	4	4	4	4	4	4	5	3	4	3	3.9	
CO6	4	4	4	4	4	4	4	5	4	4	4	4.0	
Overall Mean Score for COs													4.0

Result: The Score for this Course is 4.0 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester II
18PIT2109**

**Hours/Week: 3
Credits : 2**

Software Lab-III: WEB DESIGN & PHP

Course Outcomes:

1. Create a simple web-based system
2. Develop, Test and debug a simple PHP scripts.
3. Design PHP scripts that are used to create and populate database
3. Apply distributed techniques cookies manipulation in web-based systems.
4. Design to upload the file and images
5. Test and debug object-oriented PHP scripts
6. Design and Manipulate forms to provide user authentication.

List of Practical Exercises

HIML

1. Working With Basic Tags
2. Usage of New Semantic Elements
3. Create Form Input and Validation
4. Design CSS3 style sheet to define settings for heading, body, table and links
5. Multiple Backgrounds using CSS3

PHP

6. Using Controls and Functions.
7. Passing Variables.
8. String Functions.
9. Arrays.
10. File uploading.
11. Image Manipulation.
12. Develop a College Application Form using MYSQL Table.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PT2109	Title of the Paper Software Lab-III: WEB DESIGN & PHP										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	4	4	3	4	4	4	4	4	4	4	3.8	
CO2	4	4	4	4	4	3	4	4	4	4	4	3.9	
CO3	4	4	4	3	3	4	4	4	4	4	4	3.8	
CO4	3	4	4	4	4	4	4	4	4	3	3	3.7	
CO5	3	4	4	4	3	4	4	4	4	4	3	3.7	
CO6	4	3	4	3	4	3	3	4	4	4	4	3.6	
Overall Mean Score for COs												3.7	

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester II
18PIT2110**

**Hours/Week: 3
Credits : 2**

Software Lab-IV: IoT PROGRAMMING

Course Outcomes:

1. Perform simple operations using Python programming
2. Implement basic functionality of Pi 3 operating system
3. Ability to operate Raspberry Pi using different interfaces
4. Ability to Perform File handling and Object Oriented Programming in Python
5. Ability to use various types PINs and circuits.
6. Demonstrate knowledge of project and testing using Raspberry Pi and Python

List of Practical Exercises

1. Simple Programs.
2. Flow Control.
3. Functions
4. Native Data Types
5. File Handling
6. Object And Class
7. Iterators
8. Genertors
9. Clouser
10. Decorters

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2110	Title of the Paper Software Lab-IV: IoT PROGRAMMING										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
	CO1	4	4	4	4	4	4	3	5	4	3	4	3.9
CO2	4	4	4	3	4	3	4	5	4	4	3	3.8	
CO3	3	4	4	4	3	4	4	5	4	4	4	3.9	
CO4	4	4	4	4	3	4	4	5	4	4	3	3.9	
CO5	4	4	4	4	4	4	3	5	4	4	3	3.9	
CO6	4	4	4	4	4	3	4	5	4	4	4	4.0	
Overall Mean Score for COs												3.9	

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs =	Total of Values	Mean Overall Score for COs =	Total of Mean Scores
	Total No. of POs & PSOs		Total No. of COs

**Semester II
18PIT2202A**

**Hours/Week: 4
Credits : 4**

Core Elective-II: INFORMATION SECURITY

Course Outcomes:

1. Learn the basic concepts of Information Security
2. Emphasize the need for security in different Aspects
3. To evaluate legal, ethical and professional aspects of Information Security.
4. Familiarize in intrusion detection and Prevention.
5. Recognize various security Scanning and Analysis Tools
6. Understand the concept of Cryptography and Recognize its Tools

Unit-I: 10 hr
Introduction to Information Security: Why is Security –Components of Information System – The System Development Life Cycle – Security Development life cycle - Security Professionals and the Organizations – Communities of Interest – Information Security.

Unit-II: 10 hr
The Need for Security: Business needs first – Threats – Attacks – Secure Software Development.

Unit-III: 10 hr
Legal, Ethical, and Professional Issues in Information Security: Law and Ethics in Information Security -Relevant U.S. Laws -Ethics and Information Security-Codes of Ethics and Professional Organizations.
Planning for Security: Information Security Planning and Governance - Information Security Policy, Standards, and Practices - Security Education, Training, and Awareness Program.

Unit-IV: 10 hr
Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools: Intrusion Detection and Prevention Systems- Scanning and Analysis Tools.

Unit-V: 10 hr
Cryptography: Foundations of Cryptology - Cipher Methods - Cryptographic Algorithms- Cryptographic Tools- Attacks on Cryptosystems.

Textbook

1. Michael E. Whitman, Herbert J. Mattord, "Principles of Information Security" Fourth Edition, Course Technology, Cengage Learning, USA, 2012.

Books for Reference

1. Jason Andress, "The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practise", Elsevier Inc, USA, 2011
2. Mark Stamp, "Information Security: Principles and Practice", John Wiley & Sons, INC, Publications, Canada, 2011.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2202A	Title of the Paper Core Elective-II: INFORMATION SECURITY										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
	4	4	4	4	4	4	4	4	4	4	4		
	4	4	4	3	4	4	3	4	4	4	3		
	4	4	4	4	3	4	3	3	4	4	4		
	4	4	4	4	3	4	3	4	3	4	4		
	4	4	4	3	4	4	4	3	4	4	4		
	4	4	4	4	3	4	4	3	4	4	4		
CO6	4	4	3	4	3	4	3	3	4	3	4	3.5	
Overall Mean Score for COs												3.7	

Note: Result: The Score for this Course is 3.7 (High Relationship)

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester II
18PIT2202B

Hours/Week: 4
Credits : 4

Core Elective-II:
REAL TIME OPERATING SYSTEMS

Course Outcomes:

1. Understand the aspects of Real Time Embedded concepts
2. Learn the Essentials of Open Source RTOS and their usage
3. Identify the proper technique to design a Real-Time System
4. Spell out VxWorks RTOS and real time application programming with it
5. Build the device driver and kernel internal for Embedded OS
6. RTOSearn and apply the knowledge of Memory systems

Unit-I: **10 hr**
EMBEDDED OS INTERNALS: Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication – Semaphore, Pipes, FIFO, Shared Memory Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling. Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network.

Unit-II: **10 hr**
OPEN SOURCE RTOS: Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matrix in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS. POSIX standards.

Unit-III: **10 hr**
REAL TIME KERNEL BASICS: Converting a normal Linux kernel to real time kernel, Xenomai basics. Overview of Open source RTOS for Embedded systems (Free RTOS/ ChibiosRT) and application development. Real Time Operating Systems: Event based, process based and graph based models, Petrinet models. Real time languages, real time kernel, OS tasks, task states, task scheduling, interrupt processing, clocking, communication and Synchronization. Control blocks, memory requirements and control, kernel services.

Unit-IV: **10 hr**
VXWORKS/FREE RTOS: VxWorks/Free RTOS Scheduling and Task Management – Realtime Scheduling, Task Creation Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems – General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral.

Unit-V: **10 hr**
CASE STUDY: Software Development and Tools: Simulators, debuggers, cross compilers, in circuit emulators for the microcontrollers. Interface Issues Related to Embedded Systems: A/D, D/A converters, FPGA, ASIC, diagnostic port. Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board

Textbooks

1. Venkateswaran Sreekrishnan,” Essentail Linux Device Drivers:”, 1st Kindle edition, Prentice Hall, 2008. Unit-I
2. Jerry Cooperstein,”Writing Linux Device Drivers: A Guide with Exercises”, J.Cooperstein Publishers, 2009. Unit-II
3. Qing Li and CarolynYao, “Real Time concepts for Embedded Systems” Qing Li, Elseveir. ISBN:1578291241 CMP Books, 2003. Unit-III
4. Raj Kamal, “Embedded Systems Architecture Programming and Design”, Tata McGraw Hill, 2011. Unit-IV
5. KVK Prasad, “Embedded/Real time Systems concepts, Design and Programming Black Book:”, Wiley India, 2003. Unit-V

Books for Reference

1. Seppo J Ovaska, Phillip A. Laolante, “Real-Time Systmes Design and Analysis: Tools for the Practictioner”, 4th Edition, 2013.
2. Ward, Paul T & Mellor, Stephen,” Structured Development for Real – Time Systems v1,v2,V3:Implementation Modeling Techniques” Prentice hall, 2015.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2202B	Title of the Paper Core Elective-II: REAL TIME OPERATING SYSTEMS										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3	3	3	4	4	4	3	4	3	2	3.36	
CO2	4	2	4	3	2	4	3	4	4	2	2	3.09	
CO3	4	3	3	4	2	4	3	3	3	4	3	3.27	
CO4	3	4	4	3	3	3	4	3	3	4	2	3.27	
CO5	4	3	4	3	3	4	3	4	3	2	3	3.27	
CO6	4	4	4	4	3	4	3	4	3	4	4	3.70	
Overall Mean Score for COs												3.54	

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester II
18PIT2111

Hours/Week: -
Credits : 2

Self-paced Learning: MOBILE COMMUNICATION

Course Outcomes:

1. Familiarize various generations of mobile communications and the concept of cellular communication, basics of wireless communication
2. Knowledge acquired of GSM, IS-95 CDMA mobile communication standard, its architecture, logical channels, advantages and limitations.
3. Comprehension of 3G mobile standards and their comparison with 2G technologies.
4. Understand multicarrier communication systems and differentiate various Wireless LANs.
5. Understand multicarrier communication systems.
6. Knowledge of infrastructure and Ad Hoc networks.

Unit-I: INTRODUCTION: Applications - A Short History Of Wireless Communication - A Market. For Mobile Communications - A Simplified Reference Model. WIRELESS TRANSMISSION: Frequencies For Radio Transmission -Signals - Antennas - Signal Propagation – Multiplexing - Modulation - Spread Spectrum - Cellular Systems.

Unit-II: MEDIUM ACCESS CONTROL: Motivation for A Specialized MAC - SDMA - FDMA - TDMA – CDMA. TELECOMMUNICATIONS SYSTEMS: GSM.

Unit-III: SATELLITE SYSTEMS: Applications – Basics – Routing – Localization – Handover. BROADCAST SYSTEMS: Cyclical Repetition Of Data - Digital Audio Broadcasting - Multi-Media Object Transfer Protocol - Digital Video Broadcasting - Convergence Of Broadcasting And Mobile Communications.

Unit-IV: WIRELESS LAN: Infrared Vs Radio Transmission - Infrastructure And Ad-Hoc Network - HIPERLAN – Bluetooth.

Unit-V: SUPPORT FOR MOBILITY: World Wide Web - iMode- Syncml

Textbook

1. Jochen H. Schiller, “Mobile Communications”, 2nd Edition, Pearson education limited, 2003.

Book for Reference

1. Uwe Hansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2111	Title of the Paper Self-paced Learning: MOBILE COMMUNICATION										Hours -	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
	CO1	4	3	4	2	2	4	3	2	4	2	4	3.1
CO2	4	3	4	2	2	4	3	2	4	3	4	3.2	
CO3	4	4	3	4	2	3	4	2	3	4	3	3.3	
CO4	4	4	4	3	2	4	4	2	3	4	4	3.5	
CO5	4	3	3	4	2	4	3	3	3	4	3	3.2	
CO6	3	4	4	3	3	3	4	3	3	4	2	3.2	
Overall Mean Score for COs												3.3	

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
Relation	1	2	3	4	5
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester II
18PSS2301

Hours/Week: 4
Credits : 4

IDC: SOFT SKILLS

Course Outcomes:

- Students are taught the various nuances of grooming such as, good manners and etiquettes and they are trained to practice them in the class rooms.
- Students are empowered with public speaking skills via extempore speeches and prepared speeches, presented before the class and assessed by the trainer as well as the companions which eventually helps build self confidence of the students.
- Students learn the different types of resumes and different types of interview skills and write and print their own resumes and present before the interview panel for their mock interview.
- Students actively learn the ten parameters of group discussion, perform on the stage with their colleagues, which is videotaped, reviewed and evaluated.
- As students go through their teenage, self discovery becomes a tool to develop their personality facilitated with scientific psychological personality tests.
- Students are guided to knowing their SWOT (Strengths, Weaknesses, Opportunities and Threats) and setting their short term and long term goals for their lives.

Module 1: Basics of Communication: Definition of communication, Process of Communication, Barriers of Communication, Non-verbal Communication, **Effective Communication:** The Art of Listening, Exercises in Kinesthetics, Production of Speech, Organization of Speech, Modes of delivery, Conversation Techniques, Dialogue, Good manners and Etiquettes, Politeness markers & Listening links.

Module II: Resume Writing: What is Resume? Types of Resume? Chronological, Functional and Mixed Resume, Steps in preparation of Resume, structure and framework for writing resume, Intensive training / personalized training on resume writing. **Interview Skills:** Common interview questions, Attitude, Body Language, The mock interviews, Phone interviews, Behavioral interviews.

Module III: Group Discussion: Group Discussion Basics, GD Topics for Practice, Points for GD Topics, Case-Based and Article based Group Discussions, Points for Case Studies, and Notes on Current Issues for GDS & Practicum with video coverage. **Team Building:** Team Vs Group – Synergy,

Stages of Team Formation, Broken Square-Exercise, Win as much as you win- Exercise, Leadership – Styles, Work ethics.

Module IV: Personal Effectiveness: Self Discovery, Self Esteem, Goal setting, Problem-solving, Conflict and Stress Management

Module V: Numerical Ability: Average, Percentage, Profit and Loss, Problems on ages, Simple Interest, Compound Interest, Area, Volume and Surface Area, Time and Work, Pipes and Cisterns, Time and Distance, Problems on Trains, Boats and Streams, Calendar, Clocks, Permutations and Combinations, Probability.

Module VI: Test of Reasoning: Series Completion, Analogy, Data Sufficiency, Blood Relations, Assertion and Reasoning, Logical Deduction, Direction.

Non-Verbal Reasoning: Series, Classification

Text Book

1. Melchias, G., Balaiah John., John Love Joy (Eds) 2015. *Winners in the making*. St. Joseph's College, Trichy-2

References

1. Aggarwal, R. S. *Quantitative Aptitude*, S.Chand & Sons
2. Aggarwal, R.S. (2010). *A Modern Approach to Verbal and Non Verbal Reasoning*. S. Chand & Co, Revised Edition.
3. Covey, Stephen. (2004). *7 Habits of Highly effective people*, Free Press.
4. Egan Gerard (1994). *The Skilled Helper* (5th Ed). Pacific Grove, Brooks/ Cole.
5. Khera, Shiv (2003). *You Can Win*. Macmillan Books, Revised Edition.
6. Murphy, Raymond. (1998). *Essential English Grammar*. 2nd ed., Cambridge University Press.
7. Prasad, L. M. (2000). *Organizational Behaviour*, S.Chand & Sons.
8. Schuller, Robert. (2010). *Positive Attitudes*. Jaico Books.
9. Trishna's (2006). *How to do well in GDs & Interviews*, Trishna Knowledge Systems.
10. Yate, Martin. (2005). *Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting*.

Modules	Topics	Examination Pattern	
		CIA	Online
I	Basics of Communication	15	5
II	Resume Writing & Interview Skills	15	5
III	Group Discussion & Team Building	10	5
IV	Personal Effectiveness	10	5
V	Numerical Ability (Common Session)	5	10
VI	Test of Reasoning (Common Session)	5	10
Total		60	40

Semester II 18PIT2301

Hours/Week: 4
Credits : 4

IDC (WS): COMPUTER GENERATED IMAGERY

Course Outcomes:

1. Understand the basic concepts of multimedia components
2. Understand the elements of graphic design
3. Distinguish between 2D and 3D images
4. Manipulate images in GIMP
5. Create basic 3D animations
6. Understand the fundamentals of 3D rendering and optimization.

Unit-I:

8 hr

INTRODUCING MULTIMEDIA: The Importance of Multimedia – Impact of Multimedia – Configuration of a Multimedia PC – Taxonomy of Multimedia Objects – Multimedia Computer Components – Emerging Technology.

Unit-II:

8 hr

ELEMENTS OF GRAPHIC DESIGN: Point – Line – Shape – Form – Light – Color – Texture – Scale – Movement – Space – Balance – Proportion – Abstraction – Typography.

Unit-III:

10 hr

2D GRAPHICS WITH GIMP: Basic Computer Graphics – IMAGE MANIPULATION: Straightening – Cropping – Scaling – Perspective FIXING IMAGES: Assessing Images – Brightness and Darkness - Editing – Color – Brushes – Sharpening – Removing Noise.

Unit-IV:

12 hr

DIGITAL IMAGING PROJECTS: Layers – Adding Text to Images - Filters – Cloning - DIGITAL ART: Painting in GIMP – Tools – Advantages – Color Basics – Drawing in Gimp – Tools for Drawing – Drawing Freely – Drawing with Selections – Assistive Painting – Problems with Paths – Paths Dialog.

Unit-V:

12 hr

FUNDAMENTALS OF 3D: History of Graphics and Special Effects – 3D Hardware and Software – POLYGONS: 2D to 3D transformation – Meshes – Extruding – Edges and Edge Loops – UV coordinates – Aesthetics and Compatibility – NURBS: From Straight to Curvy – Nurb Surfaces – Advantages and Disadvantages – RENDERING: Image Size and Aspect –

Quality and Optimization – Antialiasing – Bucket Rendering – Batch Rendering – Network Rendering – Stylized Renders - Tools to Use.

Textbooks

1. Fred T. Hofstetter, “Multimedia Literacy” 3rd Edition, McGraw-Hill International, 2001.
Unit: I
2. Richard Poulin, “The Language of Graphic Design - An Illustrated Handbook for Understanding Fundamental Design Principles”, Rockport Publishers, 2011. Unit: II
3. Jan Smith, Roman Joost, “GIMP for Absolute Beginners”, Apress International, 2012. Units: III & IV
4. Ami Chopine, “3D Art Essentials: The Fundamentals of 3D Modeling, Texturing, and Animation”, Focal Press, 2011. Unit: V

Books for Reference

1. Daniel James, “Crafting Digital Media: Audacity, Blender, Drupal, GIMP, Scribus, and Other Open Source Tools”, Apress International, 2009.
2. John M Blain, “The Complete Guide to Blender Graphics Computer Modeling and Animation”, Taylor & Francis Group, 2012.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2301	Title of the Paper IDC (WS): COMPUTER GENERATED IMAGERY										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	3	4	3	3	4	4	3.7	
CO2	4	4	4	4	4	4	4	3	3	4	3	3.7	
CO3	4	4	4	3	4	4	3	4	3	4	4	3.7	
CO4	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO5	4	4	4	4	3	3	4	4	3	4	3	3.6	
CO6	4	3	4	2	2	4	3	2	4	2	4	3.0	
Overall Mean Score for COs												3.4	

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$		Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$	
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Semester II
18PIT2112

Hours/Week: 2
Credits : 1

PC TROUBLE SHOOTING

Course Outcomes:

1. Install operating systems into partitions
2. Troubleshoot problems in Operating System
3. Install Network Hardware and Troubleshoot connections

UNIT I:

Operating System Installation

UNIT II:

Hardware Assembling

UNIT III:

Basic Network Configuration

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Code 18PIT2112	Title of the Paper PC TROUBLE SHOOTING										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	3	5	4	3	4	3.9	
CO2	4	4	4	3	4	3	4	5	4	4	3	3.8	
CO3	3	4	4	4	3	4	4	5	4	4	4	3.9	
Overall Mean Score for COs												3.8	

Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester III
18PIT3113

Hours/Week: 5
Credits : 4

**Online Course:
BIG DATA ANALYTICS**

Course Outcomes:

1. Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data;
2. Collect, manage, store, query, and analyze various form of big data;
3. Gain hands-on experience on large-scale analytics tools to solve some open big data problems;
4. Understand the impact of big data for business decisions and strategy.
5. Address the limitations and challenges of working in a big data environment.
6. Utilize the opportunities for commercial and/or social benefit.

Total Hours:

60 Hours (Contact – 36 + Outside – 24)

Intended for :

Any PG students with Computer Science Background

Prerequisite :

Students should know fundamentals of RDBMS, SQL Queries and some basic programming

Course Content :

E-Contents will be available online

Module Description	Discussion Hours	Outside Hours	Module Objective	Learning Outcome
Module I: Introduction to Big Data • Business Importance of Big Data • Characteristics of Big Data • Big Data Processing • Tools and Techniques for Analysing Big Data • Demonstration - Movie Review Analysis	4	2	To understand big data concepts and its importance in business field	a) Understand basics of big data b) Have a clear idea on the various tools and techniques used with big data c) Perform some analysis based on sample dataset
Module II: Hadoop Fundamentals • Hadoop Architecture • Hadoop Installation Prerequisite • Single Node vs Multi Node Installation • Overview of Hadoop Ecosystem • Demonstration - Single node Installation	4	4	To understand Hadoop Framework and try hands on in Hadoop single node installation	a) Understand Hadoop Architecture b) Installing Hadoop in Single node c) Understand Hadoop Ecosystem components
Module III: Map Reduce Programming • Map Reduce Architecture • Map Reduce Internals • Map Reduce Phases • Text processing using Python Language • Demonstration - Word Count	8	6	To understand various phases of Map Reduce Programming and how to perform Text processing using Python	a) Understand fundamentals of Map reduce programming b) Understand how to process text information c) Execute simple Map Reduce programmes

Module Description	Discussion Hours	Outside Hours	Module Objective	Learning Outcome
Module IV: NoSQL - Move to NoSQL from RDBMS - NoSQL Features - Overview of MongoDB - MongoDBvs Other NoSQL databases - Demonstration: Working MongoDB with CatLog	10	6	To understand the fundamentals of NoSQL and in particular about MongoDB	a) Understand the nuances of NoSQL databases b) Working with MongoDB
Module V: Data Analytics using Pig - Introduction to Pig - Pig Data Types - Representing Data in Pig - Pig Queries - Demonstration: Pig - Installation and executing sample queries	10	6	To understand data analysis using Hadoop Ecosystem tool Pig	a) Understand how to analyse data using Pig b) Execute Sample Pig Queries

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PT3113	Title of the Paper Online Course: BIG DATA ANALYTICS										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	Mean Score of COs	
CO1	3	4	4	4	4	3	3	4	4	4	4	3.7	
CO2	4	3	4	4	3	4	4	4	3	3	4	3.6	
CO3	4	3	4	3	4	4	3	4	4	3	3	3.5	
CO4	3	3	4	3	4	3	4	4	4	4	4	3.6	
CO5	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO6	4	4	4	4	3	4	3	4	4	4	4	3.8	
Overall Mean Score for COs													3.7

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester III
18PIT3114

Hours/Week: 6
Credits: 4

JAVA SCRIPT PROGRAMMING ON THINGS

Course Outcomes:

1. Understand the working of JavaScript development environment
2. Ability to perform client side validation on HTML forms
3. Learn to implement JQuery in HTML pages
4. Ability to discern various development boards for IoT programming
5. Develop IoT applications with Node.JS Johnny Five
6. Ability to Connect the devices to Cloud services

Unit-I

13 hr

INTRODUCTION TO JAVASCRIPT: Types of Data in JavaScript – Variables – Arrays – Decision Making Statements – Looping Statements – Functions and Scope.

Unit-II

13 hr

ADVANCE FEATURES OF JAVASCRIPT: Objects in JavaScript – String objects – Array objects – Math object – Date object – Timers in a web page – Introduction to the Browser's objects – Events in JavaScript – Types of Events – HTML forms.

Unit-III

13 hr

INTRODUCTION TO JQUERY: Consuming Data with JQUERY – JQuery's API – Selecting elements – Changing style – Creating, Appending and removing elements – Handling events – Using JQuery for Ajax.

Unit-IV

13 hr

INTRODUCTION TO NODE.JS PROGRAMMING: Internet of Things – JavaScript for Distributed Programming – JavaScript Runtime Environments – The Node.js API – JavaScript for the Hardware Abstraction Layer – The node-serialport library – The Johnny-Five Library.

Unit-V

13 hr

NODE.JS WITH ARDUINO AND RASPBERRY PI: Arduino – The Firmata Bridge – Functional Blocks of an MCU – Firmware – The Raspberry Pi – BeagleBone – The Intel Edison – Using Embedded Linux – Network Configuration – Running Node.js – Deploy Projects with Git.

Textbooks

1. Jeremy McPeak, Paul Wilton, “*Beginning JavaScript*”, Wrox-A Wiley Board, Fifth Edition,.
2. Patrick Mulder and Kelsey Breseman, “*Node.js for Embedded Systems*”, First Edition, O'Reilly.

Book for Reference

1. Jon Duckett, “*Java Script and JQuery: Intuitive front-end Web Development*”, Wiley, USA, 2014.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PT3114	Title of the Paper JAVA SCRIPT PROGRAMMING ON THINGS										Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	4	3	3	4	4	3.8	
CO2	4	4	4	4	4	4	4	4	3	4	3	3.8	
CO3	4	4	4	3	4	4	4	4	3	4	4	3.8	
CO4	4	4	4	4	4	4	4	4	4	4	4	4.0	
CO5	4	4	4	4	4	4	4	4	3	4	3	3.8	
CO6	4	4	4	4	4	4	4	4	4	4	4	4.0	
Overall Mean Score for COs													3.9

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester III
18SCS3101BHours/Week: 6
Credits : 5

Inter-disciplinary Core:
MOBILE APPLICATION DEVELOPMENT USING ANDROID

Course Outcomes:

1. Understand the basic concept of mobile devices and types of mobile operating system
2. Ability to know the concept of cross platform system architecture
3. Use the development tools in the Android development environment
4. To develop their own apps using the major components of Android API
5. Use the Java programming language to build Android apps
6. Analyze the concept of android SQLite and managing database.

Unit-I:**9 hrs**

MOBILE APPLICATION DEVELOPMENT: Mobile Device Evolution – Smart Phone's- Tablet PC's – Classic MAD Challenges – Mobile Platform – Types of Mobile Platforms(Mobile OS) – Mobile Applications - Cross Platform Mobile Apps Development- Benefits of Cross Platform MAD – Cross Platform System Architecture.

Unit-II:**13 hrs**

(a)ANDROID: Introduction to Android – History of Android – Android Architecture – App Architecture – Activities in Depth – Services in Depth– Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Starting the AVD

(b)CREATING ANDROID PROJECT: Starting a New Project in Eclipse - Deconstructing Your Project – Setting up an Emulator – Creating Launch Configuration – Running the Hello Android App – Understanding the Project Structure.

Unit-III:**13 hrs**

USER INTERFACE RECIPIES: Customizing the Window – Creating and Displaying Views – Creating Popup Menu Actions – Scrolling Text View Ticker – Animating a View – Creating Draw Tables as Backgrounds – Applying Masks Images.

Unit-IV**13 hrs**

UNDERSTANDING ANDROID RESOURCES : Understanding Resources - Dimensions - Styles - Themes - Values - Menus – Colors - Working with Resources - Moving Strings into Resources - Making Your Apps Global with Resources.

TURNING YOUR APPLICATION INTO A HOME-SCREEN WIDGET: Working with App Widgets in Android - Working With Remote Views - Using App Widget Providers - Working With Pending Intents - Understanding the Android Intent System - Understanding Intent Data - Evaluating Intents - Using Pending Intents - Creating the Home-Screen Widget - Implementing the App Widget Provider Communicating with the App widget - Building the App Widget's Layout - Doing Work Inside an App Widget Provider.

Unit-V:**12 hrs**

PERSISTING DATA: Persisting Data – Reading and Writing Files – Using Files As Resources - Managing Database – Querying the Database – Backing Up Data – Sharing Your Database – Sharing Your Other Data.

Text books

1. Yonathan Akilu Redda, “Cross Platform Mobile Applications Development” NTNU, 2012 Unit-I.
2. Dave smith, Jeff Friesen, “Android Recipes Problem Solution Approaches”, Apress, 2011. Units IIa, III, V.
3. Donn Felker, “Android Application Development for dummies”, Wiley Publishing Inc, 2011. Unit-IIb, IV.

Book for Reference

1. Jerome J.F DiMarzio, “Android a programmers guide” McGraw-Hill, 2008.
2. Wei-Meng Lee, “Beginning Android Application Development” Wrox publications, 2011.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18SCS3101B	Title of the Paper Inter-disciplinary Core: MOBILE APPLICATION DEVELOPMENT USING ANDROID											Hours 6	Credits 5
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6			
	4	3	4	4	4	4	3	3	4	4	4			
CO1	4	4	4	3	3	3	4	4	3	3	4	3.7		
CO2	3	4	4	4	4	4	4	3	4	4	3	3.5		
CO3	4	3	4	3	4	4	4	4	4	3	4	3.7		
CO4	4	4	4	4	4	4	4	4	4	4	4	3.7		
CO5	4	4	4	4	4	4	4	4	4	4	4	4.0		
CO6	4	4	3	4	3	4	3	4	4	4	3	3.6		
Overall Mean Score for COs													3.7	

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
Relation Quality	1	2	3	4	5
	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Software Lab-V:
IoT PROGRAMMING USING JAVA SCRIPT**

Course Outcomes:

1. Understand the working of JavaScript development environment
2. Demonstrated various client side validation on HTML forms using Java Script
3. Implement JQuery in HTML pages for design and functionality
4. Work on various development boards for IoT programming
5. Develop IoT applications with Node.JS Johnny Five
6. Ability to Connect the devices to Cloud services

List of Practical Exercises

1. Simple Programs
2. Event Programming
3. HTML Forms and Validation
4. JSon -Sending, Receiving and Storing Data
5. JSon – DOM with HTML
6. JQuery
7. Setting up NodeJS with Johnny-Five
8. Blink Led
9. Digital Clock
10. Proximity On-Off light

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PIT3115	Title of the Paper Software Lab-V: IoT PROGRAMMING USING JAVA SCRIPT										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	4	4	4	3	4	4	3	4	3.8	
CO2	4	4	4	3	4	3	4	4	4	4	3	3.7	
CO3	3	4	4	4	3	4	4	3	4	4	4	3.7	
CO4	4	4	4	4	3	4	3	4	4	4	3	3.7	
CO5	4	4	4	4	4	4	3	4	4	4	3	3.8	
CO6	4	4	4	4	4	3	4	4	3	4	4	3.8	
Overall Mean Score for COs												3.7	

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester III
18PIT3116

Hours/Week: 3
Credits : 2

**Software Lab-VI:
ANDROID**

Course Outcomes:

1. Describe and compare different mobile application models/architectures and patterns.
2. Describe the components and structure of a mobile development framework
3. Install and configure Android application development tools.
4. Design and develop user Interfaces for the Android platform.
5. Save state information across important operating system events.
6. Apply Java programming concepts to Android application development.

List of Practical Exercises

1. Layouts
2. Simple Controls
3. Changing Colours and Backgrounds
4. Manipulating Text
5. Working with Images
6. Menu Creation
7. Implicit Intents
8. Explicit Intents
9. Links
10. Adding Audio & Video
11. Widgets
12. Data Storing & Retrieving

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PIT3116	Title of the Paper Software Lab-VI: ANDROID										Hours 3	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	4	4	4	3	4	4	4	3.7	
CO2	4	4	4	3	3	3	4	4	3	4	4	3.6	
CO3	4	3	4	4	3	4	4	3	4	3	3	3.5	
CO4	3	4	4	3	4	4	3	4	4	3	4	3.6	
CO5	4	3	4	4	4	4	4	4	4	4	4	3.9	
CO6	3	4	3	4	4	3	4	4	3	4	3	3.5	
Overall Mean Score for COs												3.6	

Result: The Score for this Course is 3.6 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Semester III
18PIT3203A

Hours/Week: 4
Credits : 4

Core Elective-III:
HIGH PERFORMANCE COMPUTING

Course Outcomes:

1. Understand fundamental concepts and techniques in parallel computation structuring and design.
2. To Study various architectures of high - performance computing systems.
3. To demonstrate the principles of Parallel Algorithm Design.
4. Investigate modern design structures of pipelined and multiprocessors systems.
5. Understand the algorithms using parallel programming principle.
6. To study about Parallel sparse matrix and vector multiplication.

Unit-I **10 hr**

Modern Processors: Stored-program computer architecture – General-purpose cache-based microprocessor architecture – Memory hierarchies – Multi core processors - Multithread processors - Vector processors - Basic optimization techniques for serial code - Common sense optimizations - Simple measures - large impact - Role of compilers.

Unit-II **10 hr**

Parallel Computers: Data access optimization - Balance analysis and light speed estimates - Storage order - Taxonomy of parallel computing paradigms - Shared memory computers - Distributed memory computers - Hierarchical systems – Networks - Basics of parallelization- Parallelism – Parallel scalability.

Unit-III **10 hr**

Principles of Parallel Algorithm Design: Preliminaries - Decomposition techniques - Characteristics of tasks and interactions - Mapping techniques for load balancing - Methods for containing interaction overheads - Parallel algorithm models – Basic communication operations.

Unit-IV **10 hr**

Sorting and Graph Algorithms: Dense matrix Algorithm: Matrix-vector multiplication - Matrix-matrix multiplication- **Sorting:** Issues in sorting on parallel computing - Sorting networks - Bubble sorts and its variants - Quick sort - Graph algorithms - Definition and representation - Prims algorithm -

Dijkstra's algorithm - All pairs shortest path - Transitive closure – Connected components.

Unit-V **10 hr**

Shared-Memory Parallel Programming with OpenMP: Short introduction to OpenMP, Advanced OpenMP: Wavefront parallelization, Profiling OpenMP programs Performance pitfalls, Case study : OpenMP-parallel Jacobi algorithm & Parallel sparse matrix-vector multiply.

Text Books:

1. Georg Hager and Gerhard Wellein, Introduction to High Performance Computing for Scientists and Engineers, Chapman & Hall, 2010.
2. Ananth Grama and George Karypis, Introduction to parallel computing, Addison-Wesley 2009.

Books for Reference

1. John Levesque and Gene Wagenbreth, High Performance Computing: Programming and Applications, Chapman & Hall, 2010

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PT3203A	Title of the Paper Core Elective-III: HIGH PERFORMANCE COMPUTING										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	3	3	3	3	3	3	3	3	4	4	3.1	
CO2	3	4	3	3	3	3	3	4	4	3	4	3.3	
CO3	3	3	3	4	3	3	4	3	4	3	3	3.2	
CO4	4	3	3	3	4	3	3	3	4	4	3	3.3	
CO5	3	3	3	3	3	4	4	3	3	3	3	3.1	
CO6	3	4	3	3	3	4	3	4	3	4	3	3.3	
Overall Mean Score for COs													3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs =	Total of Values	Mean Overall Score for COs =	Total of Mean Scores
	Total No. of POs & PSOs		Total No. of COs

**Semester III
18PIT3203B**

**Hours/Week: 4
Credits : 4**

Core Elective-III: INTELLIGENT NETWORKS

Course Outcomes:

1. Understand the various technologies used in telecommunications
2. Understand about architectures, and protocols used in the telecommunications industry
3. Learn the 1G, 2G, 3G, 4G, LTE, WiMAX and their role in present and future Mobility
4. Learn various types of wireless and mobility
5. Understand various network types and functions
6. Gain knowledge in cybernetics and humanistic intelligence.

Unit-I: 10 hr
INTRODUCTION TO TELECOMMUNICATIONS AND TRANSMISSION: Analog and Digital, Multiplexing Media: Twisted-Pair - Coaxial Cable-Microwave – Satellites -Fiber Optics - Data Communication Traffic - Data Transmission - OSI and TCP/IP Reference Models. INTRODUCTION TO THE INTERNET AND IP TELEPHONY: Internet and Routing Protocols-Internet Architecture, and Infrastructure -Subnetting: IPv4, IPv6, DNS.

Unit-II: 10 hr
OPEN SOURCE PLATFORMS: Mobile phones and similar devices - Arm Devices - Basic Electronics (circuit theory, measurements, parts identification). SOFTWARE HARDWARE FRAMEWORKS : Microcontrollers -Communication – Serial& Parallel - Hardware to Hardware Communication- I2C/IIC (Inter-Integrated Circuit) - SPI (Serial Peripheral Interface) – Serial UART Communication

Unit-III: 10 hr
FIBRE OPTIC NETWORKS, WIRED AND WIRELESS BROADBAND: Optical Networking Elements : Switches, Edge, Core - DSL - Cable TV Networks, Packet Cable- Fiber Solutions- Wireless Broadband- HANs, PANs, CANs, MANs. Wireless Bandwidth -Spectrum Utilization- Spread Spectrum.

Unit-IV: 10 hr
CYBERNETICS AND HUMANISTIC INTELLIGENCE: IoT and Wearables: Smart Cities and Wearable Computing as a form of urban design - Advanced

I/O-openFrameworks:Live Network feeds (push and pull) - Data persistence(saving data and preferences) - Database interface (MySQL, sqlite, XML,PHP/Web)- Linux – GPIO

Unit-V: 10 hr
CELLULAR SERVICES AND STANDARDS: Cellular: 2G, 2.5G, 3G, 4G, 5G - WiMax, LTE - mobile security – Digital Cellular Radio WIRELESS NETWORK ARCHITECTURE, WIRELESS AND MOBILITY: BFWA - WLANs - IEEE 802.11a,b,g,n - IEEE 802.16, Integration of WLANs and Cellular Networks- Mobile IP, IP Multimedia Subsystem

Textbooks

1. Lillian Goleniewski, “LIDO Telecommunications Essentials”, 2nd edition, Addison-Wesley Professional, Copyright: 2007
2. Paul Scherz and Simon Monk, “Practical Electronics for Inventors”, Third Edition, 2016.

Books for Reference

1. Programmers, Ramon, Manoel, “Intel Galileo and Intel Galileo Gen 2 API Features and Arduino Projects for Linux “ 2014 (Open Access)
2. Woodrow Barfield, “Fundamentals of Wearable Computers and Augmented Reality”, Second Edition, 2015.
3. Omesh Tickoo, Ravi Iyer, “Making Sense of Sensors: End-to-End Algorithms and Infrastructure Design” 2016

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PIT3203B	Title of the Paper Core Elective-III: INTELLIGENT NETWORKS										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	5	4	3	4	2	5	4	2	3	4	3	3.5	
CO2	4	4	3	4	2	4	4	2	3	5	3	3.5	
CO3	5	4	4	3	2	4	4	2	3	4	4	3.5	
CO4	5	3	4	2	1	5	3	2	4	3	4	3.3	
CO5	4	4	3	4	2	3	4	2	3	4	3	3.3	
CO6	5	4	4	3	1	5	3	2	4	3	4	3.4	
Overall Mean Score for COs												3.5	

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$		Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$	
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Semester III
18PIT3302

Hours/Week: 4
Credits : 4

IDC (BS):

WEB DESIGN AND CONTENT MANAGEMENT SYSTEM

Course Outcomes:

1. Understand webpage layout and design webpage using HTML
2. Design webpage using CSS
3. Build dynamic website using Server side scripting language
4. Understand the concept of Database
5. Create websites with Word Press
6. Create dynamic content and learn to backup site data

Unit-I:

10 hr

HTML5: Web Technologies – HTML - Structure of a Page – Dynamic and Static Pages – Basic Document Structure – Attribute Groups – Text Formatting – Presentational, Phrase Elements – Lists - Editing Text - Character Entities for Special Characters – Links and Navigation - Links – Directories and Directory Structures – Creating Links– Colors, Images and Objects – Using Images as Links – Tables – Basic Table Elements and Attributes – Advanced Tables – Accessibility issues with Tables.

Unit-II:

10 hr

CASCADING STYLE SHEETS: CSS – Add CSS Rules – CSS properties – Controlling Fonts – Text Formatting – Text Pseudo-Classes – Selectors – Lengths - Percentages – Box Model. More CSS: Links – Backgrounds – Lists – Tables - Outlines- Positioning with CSS – Page Layout – Understanding the site – Page Size – Designing Pages – Structuring Pages.

Unit-III:

10 hr

PHP: Creating your Development Environment- Mixing HTML and PHP - Command Line PHP - Working with Variables - Creating Constants - Understanding PHP's Internal Data Types - Operators and Flow Control. STRINGS AND Arrays: String Function - Modifying Data in an Array - Deleting Array Elements - Array with Loops - PHP Array Functions.

Unit-IV:

10 hr

DATABASE: Creating a MYSQL Database - Creating a New Table - Putting Data into the New Database - Accessing the Database -Update data into the Database- Insert data into the Database - Delete data from Database.

Unit-V:

10 hr

WORDPRESS: Introduction to WordPress: Setting up WordPress - Setting Up Database - Installing WordPress - Overview of Working of WordPress – Dashboard - Exporting and Importing of Site Content - Backup of Site data and files - Upgrading WordPress – Managing Accounts – Setting Up a WordPress Theme.

Textbooks

1. Jon Duckett, “Web Programming with HTML, CSS & JavaScript”, Wiley Publishing, 2005. Units-I & II
2. Steven Holzner, “The Complete Reference PHP”, Tata McGraw Hill Pvt.Ltd., 2008. Units-III & IV
3. Jessica Neuman Beck, Matt Beck, “Visual Quick Start Guide – WordPress”, Pearson Publication, 2014. Unit-V

Books for Reference

1. Matthew MacDonald, “HTML5: The Missing Manual”, O'Reilly, 2011.
2. Kogent Learning Solutions Inc. “HTML5 Black Book: Covers CSS3, Java Script, XML, XHTML, AJAX, PHP and JQuery”, Dreamtech Press, 2011.
3. Leon Atkinson, “Core PHP Programming”, Pearson Education, 2004
4. Lisa Sabin, “WordPress For Dummies A Wiley Brand”, 7th Edition.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PIT3302	Title of the Paper IDC (BS): WEB DESIGN & CONTENT MANAGEMENT SYSTEM										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	5	5	3	2	4	4	5	2	4	4	4	3.8	
CO2	4	4	2	1	4	4	4	2	4	4	4	3.4	
CO3	5	4	3	2	4	4	4	2	4	3	4	3.5	
CO4	4	4	2	4	1	4	4	2	2	3	3	3.0	
CO5	5	5	2	2	1	4	4	2	2	4	4	3.2	
CO6	5	4	4	3	1	5	3	2	4	3	4	3.4	
Overall Mean Score for COs												3.6	

Result: The Score for this Course is 3.6 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester III
18PIT3117**

**Hours/Week: -
Credits : 7**

MINI PROJECT

Course Outcomes:

1. Learn to plan, Design and Analyze small scale projects
2. Understand the Software development life cycle phases through various models
3. Ability to perform Critical Thinking, Reasoning, and Creative Thinking
4. Develop Interpersonal Communication
5. Ability to visualize the simple problems and provide simple solutions
6. Ability to choose an appropriate tool for the task

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PT3117	Title of the Paper MINI PROJECT (During I year Summer Vacation)										Hours -	Credits 7
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	3	3	4	4	4	3	4	3.6	
CO2	3	4	4	3	3	4	4	4	5	4	5	3.9	
CO3	4	3	3	4	3	4	5	5	3	4	4	3.8	
CO4	3	3	4	3	5	3	3	3	4	5	4	3.6	
CO5	3	4	4	4	3	5	5	5	3	3	5	4.0	
CO6	3	4	4	4	3	3	4	4	4	3	4	3.6	
Overall Mean Score for COs												3.8	

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Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping Scale	1-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester III
18PT3118**

**Hours/Week: -
Credits : 2**

COMPREHENSIVE EXAMINATION

Course Outcomes:

1. Solve simple problems using the fundamental syntax and semantics of the Java
2. Programming language
3. Recall the SQL commands to create, manipulate, nested queries, joins and query databases
4. Understand the fundamentals of PHP programming and database operations by using MySQL
5. Learn the Essentials of Open Source RTOS and their usage
6. Gain knowledge of install to different packages on Raspberry Pi understand big data concepts, Hadoop framework and its importance in business field

Unit-I:

Java, Database Systems

Unit-II:

RTOS, Web Design and PHP

Unit-III:

IOT Networking, Big Data Analytics.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Code 18PT3118	Title of the Paper COMPREHENSIVE EXAMINATION										Hours -	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	4	4	4	3	3	4	3	4	4	4	3.63	
CO2	3	4	4	4	3	3	4	4	4	3	4	3.63	
CO3	3	3	4	4	4	4	4	3	3	3	3	3.45	
CO4	4	4	4	3	4	4	3	4	4	4	3	3.72	
CO5	3	4	3	3	3	4	4	3	3	3	4	3.36	
CO6	3	4	3	4	4	4	4	4	4	4	3	3.72	
Overall Mean Score for COs												3.58	

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation Quality	0.0-1.0 Very poor	1.1-2.0 Poor	2.1-3.0 Moderate	3.1-4.0 High	4.1-5.0 Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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**Semester IV
18PIT4119**

**Hours/Week: 30
Credits : 20**

MAJOR PROJECT, DISSERTATION & VIVA-VOCE

Course Outcomes:

1. Learn to plan, design and analyze the modules
2. Understand various needs of the Industry
3. Ability to perform Critical Thinking, Reasoning, and Creative Thinking in a Workplace
4. Develop Communication Skills, Both for Interpersonal And Presentation Needs
5. Ability to visualize the problems and provide Solution by Decision Making
6. Work as an individual, or as a part of a team in a real-time industry environment
7. Able to create working databases and be familiar in DDL and DML
8. Exposure towards industry standards and strategies in software and web developments.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Code 18PIT4119	Title of the Paper PROJECT WORK										Hours 30	Credits 20
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	3	3	4	4	4	3	4	3.6	
CO2	3	4	4	3	3	4	4	4	5	4	5	3.9	
CO3	4	3	3	4	3	4	5	5	3	4	4	3.8	
CO4	3	3	4	3	5	3	3	3	4	5	4	3.6	
CO5	3	4	4	4	3	5	5	5	3	3	5	4.0	
CO6	3	4	4	4	3	3	4	4	4	3	4	3.6	
Overall Mean Score for COs													3.8

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Note:

Result: The Score for this Course is 3.8 (High Relationship)

Mapping Scale	1-20% 1	21-40% 2	41-60% 3	61-80% 4	81-100% 5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	$\text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$
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Notes

[illegible]

Notes

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for letter height. The entire page is otherwise blank, with no margins, text, or other markings.