

Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Mapping of the courses to Employability / Entrepreneurship / Skill Development

Program: B.Sc. INFORMATION TECHNOLOGY

Program Code: RJSUIT

(CBCS 2020-21)

Class	Course Name	Course Code	Topics focusing on Employability / Entrepreneurship / Skill development	Employability / Entrepreneurship / Skill development
FYBSc	Imperative Programming	RJSUIT101	Unit I: Introduction, Fundamentals of Programming language, Tokens, Data Types, Expressions and constants. Unit II: Operators and Expressions, Data Input and Output Unit III: Conditional Statements and Loops, Functions Unit IV:Program structure, Preprocessor, Arrays Unit V:Pointers, Structures and Unions, Working with file	 Skill Enhancement Analytical Skills Logical reasoning skills Interpretation Skills
	Digital Electronics	RJSUIT102	Unit I :Number System, Binary Arithmetic Unit II:Boolean Algebra and Logic Gates, Minterm, Maxterm and Karnaugh Maps Unit III :Combinational Logic Circuit, Arithmetic Circuits Unit IV :Multiplexer, Demultiplexer, ALU, Encoder and Decoder, Sequential Circuits: Flip- Flop Unit V :Counters, Shift Register	 Skill Enhancement Logical Reasoning skills Problem Solving skills Development Skills Employability Logic circuit design and building
	Operating Systems	RJSUIT103	Unit I: Introduction to Operating system, Processes and Threads Unit II: Memory Management, File Systems Unit III: Input-Output, Deadlocks Unit IV: Virtualization and Cloud, Multiple Processor Systems	 Skill Enhancement Analytical Skills

		Unit V :Case Study on LINUX and ANDROID, Case Study on Windows	
Discrete Mathematics	RJSUIT104	Unit I: Set Theory, The Logic of Compound Statements, Quantified Statements Unit II: Elementary Number Theory and Methods of Proof, Indirect Argument Unit III: Sequences, Mathematical Induction, and Recursion, Functions Unit IV: Graphs and Trees, Relations Unit V: Counting and Probability	 Skill Enhancement Logical Reasoning skills Problem Solving skills
Communication Skills	RJSUIT105	Unit I: The Seven C's of Effective Communication, Understanding Business Communication Unit II: Writing Business Messages and Documents, Developing Oral Communication Skills for Business, Presentation Process Unit III: Developing Oral Communication Skills for Business -Interviews, Meetings Unit IV: Developing Oral Communication Skills for Business -Group Discussions and Team Presentations, Communication Across Functional Areas Unit V: Understanding Specific Communication Needs	 Skill Enhancement Analytical Skills Interpersonal skills Listening skills Team work
Imperative Programming Practical	RJSUITP101	Using C++ Programming Language	Skill Enhancement Analytical Skills

Digital Electronics Practical	RJSUITP102	Designing and Building logic circuits	 Skill Enhancement Designing Skills
Operating Systems Practical	RJSUITP103	Linux OS installation, basic commands, advanced commands	 Skill Enhancement System management skill
Discrete Mathematics Practical	RJSUITP104	Implementation of different mathematical algorithms and methods	 Skill Enhancement Logical Reasoning skills Problem Solving skills Creative development skills
Communication Skills Practical	RJSUITP105		 Skill Enhancement Oratory skills Interpersonal skills Listening skills Writing skills
Python Programming	RJSUIT201	Unit I - Basic Programming Concepts. Unit II - Functions, Strings Unit III - Lists, Tuples, Dictionaries. Unit IV - Object Oriented Concepts using python Unit V - Regular Expressions.	 Skill Enhancement Analytical Skills Logical reasoning skills Program development skills Employability – developing small projects
Microprocessor Architecture	RJSUIT202	Unit I :Microprocessor, microcomputers, and Assembly Language, Architecture and Microcomputer System 8085 Microprocessor Architecture and Memory	 Skill Enhancement Analytical Skills Logical reasoning skills

	DICHITAGO	Interface Unit II: Interfacing of I/O Devices, Introduction to 8085 Assembly Language Programming, Introduction to 8085 Instructions Unit III: Programming Techniques With Additional Instruction, Counters and Time Delays, Stacks and Subroutines Unit IV: Code Conversion, BCD Arithmetic, and 16-Bit Data Operations, Software Development System and Assemblers, Interrupts Unit V: Introduction to 16 bit microprocessor – 8086, Introduction to 32 bit microprocessor -80286, 80386 and 80486, Introduction to Intel Pentium Processor	4. Assembly language development
Web Programming	RJSUIT203	Employability Unit I: Internet and the World Wide Web, Introduction to HTML5 Unit II:HTML5 Page layout and navigation, HTML5 Tables, Forms and Media Unit III:Introduction to JavaScript, Operators, Statements, Core JavaScript (Properties and Methods) Document and its associated objects, Events and Event Handlers Unit IV:Introduction to PHP Unit V:Advanced PHP and MySQL	 Skill Enhancement Analytical Skills Logical reasoning skills Program development skills Employability – web site development
Numerical and Statistical Methods	RJSUIT204	Unit I:Mathematical Modeling and Engineering Problem Solving, Approximations and	Skill Enhancement Analytical Skills

Green	RJSUIT205	Round-Off Errors Truncation Errors and the Taylor Series Unit II: Solutions of Algebraic and Transcendental Equations, Interpolation Unit III: Solution of simultaneous algebraic equations (linear) using iterative methods, Numerical differentiation and Integration, Numerical solution of 1st and 2nd order differential equations Unit IV: Least-Squares Regression, Linear Programming Unit V: Random variables, Distributions Unit I: Overview and	Logical reasoning skills 1. Skill
Computing	103011203	Issues, Initiatives and Standards Unit II: Minimizing Power Usage, Cooling Unit III :Changing the Way of Work, Going Paperless Unit IV :Recycling, Hardware Considerations Unit V :Greening Your Information Systems, Staying Green	Enhancement 2. Analytical skills 3. Research skills 4. Employability in areas of environment impact assessment
Python Programming Practical	RJSUITP201	Using Python Programming Language	 Skill Enhancement Analytical Skills Logical reasoning skills Program development skills Employability – developing small projects

	Microprocessor Architecture Practical	RJSUITP202	Developing Assembly Language Programs	 Skill Enhancement Analytical Skills Logical reasoning skills Program development skills
	Web Programming Practical	RJSUITP203	Developing Web Applications, connecting to data	 Skill Enhancement Analytical Skills Logical reasoning skills Program development skills Employability in web site development
	Numerical and Statistical Methods Practical	RJSUITP204	Implementing numerical methods in algorithms	 Skill Enhancement Analytical Skills Logical reasoning skills
	Green Computing Practical	RJSUITP205	Case study on Green technology	 Skill Enhancement Analytical Skills Research skills Employability in field of environment conservation
SYBSc	Object Oriented Programming	RJSUIT301	Unit I: Principles of OOPS: OOPS, Introduction to classes and Objects. Unit II: Introduction to JAVA Basic Concepts Unit III: Polymorphism, Inheritance Unit IV: Interfaces, Multi- threaded programming.	 Skill Enhancement Analytical Skills Logical Reasoning skills Programming skills

		Unit V : Exception handling, Packages, Managing I/O files.	
Data Structures	RJSUIT302	Unit I: Introduction, Array Unit II: Linked List Unit III: Stack, Queue Unit IV: Sorting and Searching Techniques, Tree, Advanced Tree Structures Unit V: Hashing Techniques, Graph	 Skill Enhancement Analytical Skills Logical Reasoning skills Programming skills
Computer Networks	RJSUIT303	Unit I: Introduction, Network Models, Introduction to Physical layer, Digital and Analog transmission Unit II: Bandwidth Utilization: Multiplexing and Spectrum Spreading, Transmission media, Switching, Introduction to the Data Link Layer Unit III: Data Link Control, Media Access Control, Wireless LANs, connecting devices Unit IV: Introduction to the Network Layer, Unicast Routing, Next generation IP Unit V: Introduction to the Transport Layer, Standard Client Server Protocols	 Skill Enhancement Analytical Skills Design skills Debugging skills
Database Management Systems	RJSUIT304	Unit I: Introduction to Databases, Data Models, ER Diagram and Database Schema. Unit II: Relational database model, Relational Algebra and Calculus Relational algebra, Calculus Unit III: Constraints, Views and SQL Unit IV: Transaction management and	 Skill Enhancement Analytical Skills Design skills Management skills Employability in field of database administration

		Concurrency	
Applied Mathematics	RJSUIT305	Unit V:PL-SQL Unit I: Matrices, Complex Numbers Unit II: Equation of the first order and of the first degree, Linear Differential Equations with Constant Coefficients Unit III: The Laplace Transform, Inverse Laplace Transform Unit IV: Multiple Integrals, Applications of integration Unit V: Beta and Gamma Functions, Differentiation Under the Integral Sign, Error Functions	 Skill Enhancement Analytical Skills Problem solving skills
Object Oriented Programming Practical	RJSUITP301	Object Oriented Programming with JAVA Practical	 Skill Enhancement Analytical Skills Design skills Debugging skills
Data Structures Practical	RJSUITP302	Implementing different data structures in application programs	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills
Computer Networks Practical	RJSUITP303	Implement different network protocols using software simulator tools	 Skill Enhancement Design skills Employability in field of networking as system engineer
Database Management Systems Practical	RJSUITP304	Creating database, storing data, retrieving data using SQL and PLSQL	 Skill Enhancement Analytical Skills Design skills Employability in field of data base administration.

Pro	obile ogramming ractical	RJSUITP305	Android development using App Inventor IDE	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills Employability as app designer Entrepreneurship as a free-lance mobile app developer
Ad	dvanced Java	RJSUIT401	Unit -I: Introduction- Applet, AWT, Event Handling Unit - II: Java EE Architecture, Server and Containers, Working with Servlet Unit - III: Working with databases (JDBC) Unit - IV: Introduction To Java Server Pages Unit - V: Networking in Java, Introduction to Hibernate	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills
Em	troduction to mbedded vstems	RJSUIT402	Unit I: Introduction, Core of embedded systems, Characteristics and quality attributes of embedded systems Unit II: Embedded Systems Application and Domain Specific, Embedded Hardware, Peripherals Unit III: The 8051 Microcontrollers, 8051 Programming in C Unit IV: Introduction to Arduino, Arduino Programming Unit V: Real Time Operating System (RTOS), Design and Development	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills in field of hardware and software design. Employability as embedded system designer

Computer Oriented Statistical Techniques	RJSUIT403	Unit I:The Mean, Median, Mode, and Other Measures of Central Tendency, The Standard Deviation and Other Measures of Dispersion, Introduction to R Unit II:Moments, Skewness, and Kurtosis, Elementary Probability Theory, Elementary Sampling Theory Unit III:Statistical Estimation Theory, Statistical Decision Theory, Statistics in R Unit IV:Small Sampling Theory, The Chi-Square Test Unit V:Curve Fitting and the Method of Least Squares, Correlation Theory	 Skill Enhancement Logical reasoning skills Analytical Skills
Software Engineering	RJSUIT404	Unit I :Introduction, Software Requirements, Software Processes, Software Development Process Models, Agile software development Unit II: Socio-technical system, Critical system, Requirements Engineering Processes, System Models Unit III :Architectural Design, User Interface Design, Project Management, Quality Management Unit IV :Verification and Validation, Software Testing, Software Measurement, Software Cost Estimation Unit V :Process Improvement, Service	 Skill Enhancement Logical reasoning skills Analytical Skills Writing skills Research skills Design skills

		Oriented Software Engineering, Software reuse, Distributed software engineering	
Computer Graphics and Animation	RJSUIT405	Unit I: Introduction to Computer Graphics, Scan conversion Unit II: Two-Dimensional Transformations, Three- Dimensional Transformations Unit III: Viewing in 3D, Light, Color Models and Color Applications Unit IV: Visible-Surface Determination, Plane Curves and Surfaces Unit V: Computer Animation, Image Manipulation and Storage	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills Programming skills Employability as graphic designer
Advanced Java Practical	RJSUITP401	Practical on all concepts in advanced Java theory paper	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills
Introduction to Embedded Systems Practical	RJSUITP402	Embedded C programming Arduino Programming	 Skill Enhancement Logical reasoning skills Analytical Skills Design skills
Computer Oriented Statistical Techniques Practical	RJSUITP403	Implementation of statistical concepts	 Skill Enhancement Logical reasoning skills Analytical Skills
Software Engineering Practical	RJSUITP404	Developing the document for a software project	 Skill Enhancement Research skills Analytical Skills Design skills Team building skills

	Computer Graphics and Animation Practical	RJSUITP405	Implementation of Graphic functions	 Skill Enhancement Logical reasoning skills Analytical Skills
TYBSc	Software Project Management	RJSUIT501	Unit I:Introduction to Software Project Management, Project Evaluation and Programme Management, Overview of Project Planning Unit II: Selection of an Appropriate Project Approach, Software Efforts Estimation Unit III:Activity Planning, Risk Management, Resource Allocation Unit IV:Monitoring and Control, Managing Contracts, Managing People in Software Environments Unit V:Working in Teams, Software Quality, Project Closeout	 Skill Enhancement Logical reasoning skills Analytical Skills Implementation skills Management skills
	Internet of Things	RJSUIT502	Unit I :Overview of Internet of things, Design Principles for Connected Devices, Internet Principles, M2M and IoT Fundamentals Unit II:Thinking About Prototyping, Prototyping Embedded Devices, An Overview, IP,TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses Unit III :Prototyping the Physical Design, Prototyping Online Components Writing Embedded code,	 Skill Enhancement Design and development skills Research skills Employability in the field of IOT programmer Entrepreneurship – development of IOT gadgets and their framework

Advanced Web	RJSUIT503	Prototyping Embedded Devices Unit IV :Techniques for Writing Embedded Code, Business Models Unit V : Moving to Manufacture, Ethics Unit I : Introduction to .NET	1. Skill
Programming		and C# language, Types, Objects, and Namespaces Unit II: Web forms Fundamentals, Form Controls Unit III: Error Handling, Logging, and Tracing, State Management, Styles, Themes, and Master Pages Unit IV: ADO.Net Fundamentals, Data Binding, The Data Controls Unit V: XML, Security Fundamentals, ASP.NET AJAX	Enhancement 2. Logical reasoning skills 3. Analytical Skills 4. Employability as .NET developer
Linux System Administration	RJSUIT504	Unit I :Introduction to Red Hat Enterprise Linux, Command Line, System Administration Tasks, Managing Software Unit II: Configuring and Managing Storage, Connecting to the Network Unit III :Securing Server with ip tables, Setting Up Cryptographic Services, Configuring Server for File Sharing Unit IV :Configuring DNS and DHCP, Setting Up a Mail Server, Configuring Apache on Red Hat Enterprise Linux Unit V :Introducing Bash Shell Scripting, High-Availability Clustering,	 Skill Enhancement Logical reasoning skills Analytical Skills Management skills Employability as Linux server administrator

		Setting Up an Installation	
Enterprise Java	RJSUIT505	Unit I :Understanding Java EE, Java EE Architecture, Server and Containers, Introduction to Java Servlets, Servlet API and Lifecycle, Working With Servlets, Working with Databases. Unit II: Request Dispatcher, Cookies, Session, Working With Files, Working With Non-Blocking I/O Unit III: Introduction To Java Server Pages, Getting Started With Java Server Pages, Action Elements, Implicit Objects, Scope And El Expressions, Java Server Pages Standard Tag Libraries Unit IV: Introduction To Enterprise Java Beans, Working With Session Beans, Working with Message Driven Beans, Interceptors, Java Naming and Directory Interface Persistence, Object / Relational Mapping And JPA, Introduction to Java Persistence API, Writing JPA Application, Introduction to Hibernate Unit V - Introduction to Spring Framework: Dependency Injection, Spring Jdbc Template, Spring ORM, Spring Expression Language, Spring MVC.	 Skill Enhancement Logical reasoning skills Analytical Skills Development skill Employability in the field of software development
Next Generation Technologies	RJSUIT506	Unit I :Big data, NoSQL, Introduction to MongoDB Unit II: The MongoDB Data	1. Skill Enhancement

			model, Using MongoDB Shell, MongoDB Architecture Unit III :MongoDB Storage Engine, MongoDB Use Cases, MongoDB Limitations, MongoDB Best Practices Unit IV :The End of Disk? SSD and In-Memory Databases, jQuery Unit V :JSON	 Logical reasoning skills Analytical Skills Program design skills Debugging skills Testing skills
TYBSc	Project Dissertation	RJSUIT5P1	Estimation and documentation of the project	 Skill Enhancement Research skills Analytical Skills Writing skills
	Internet of Things Practical	RJSUIT5P2	Implementation of IOT principles and building applications using Raspberry pi	 Skill Enhancement Logical reasoning skills Analytical Skills Programming skills Employability as IOT developer
	Advanced Web Programming Practical	RJSUIT5P3	Implementation of AWP concepts to develop software programs	 Skill Enhancement Logical reasoning skills Analytical Skills Problem solving skills Employability as software developer
	Linux Administration Practical	RJSUIT5P4	Installing and using different services of Linux	 Skill Enhancement Logical reasoning skills Analytical Skills

			4. System management skills
Enterprise Java Practical	RJSUIT5P5	Implementing Java programs using different frameworks like hibernate	 Skill Enhancement Logical reasoning skills Analytical Skills Employability as software developer
Next Generation Technologies Practical	RJSUIT5P6	Implementation and building of applications	 Skill Enhancement Logical reasoning skills Analytical Skills
Software Quality Assurance	RJSUIT601	Unit I: Introduction to Quality, Software Quality Unit II: Fundamentals of testing. Unit III: Unit Testing: Boundary Value Testing, Equivalence Class Testing, Decision Table—Based Testing, Path Testing, Data Flow Testing. Unit IV: Software Verification and Validation, V-test Model Unit V: Levels of Testing, Special Tests	 Skill Enhancement Logical reasoning skills Analytical Skills Research skills Management skills Problem solving skills Team building skills
Security in Computing	RJSUIT602	Unit I: Information Security Overview, Risk Analysis, Secure Design Principles Unit II: Authentication and Authorization, Encryption, Storage Security, Database Security Unit III: Secure Network Design, Network Device Security, Firewalls,	 Skill Enhancement Logical reasoning skills Analytical Skills Employability in the field of cyber security

		Wireless Network Security Unit IV :Intrusion Detection and Prevention Systems, Voice over IP (VoIP) and PBX Security, Operating System Security Models Unit V :Virtual Machines and Cloud Computing, Secure Application Design, Physical Security	
Business Intelligence	RJSUIT603	Unit I :Business intelligence, Decision support systems Unit II: Mathematical models for decision making, Data mining, Data preparation Unit III :Classification, Clustering Unit IV :Business intelligence applications: Marketing models, Logistic and production models, Data envelopment analysis Unit V :Knowledge Management, Artificial Intelligence and Expert Systems	 Skill Enhancement Logical reasoning skills Analytical Skills Problem solving skills
Principles of Geographic Information Systems	RJSUIT604	Unit I: The nature of GIS, Geographic Information and Spatial Database Models and Representations of the real world, Organizing and Managing Spatial Data The Temporal Dimension Unit II: Data Management and Processing Systems Hardware and Software Trends, Stages of Spatial Data handling, GIS and Spatial Databases Unit III: Spatial Referencing and Positioning, Satellite- based Positioning, Data	 Skill Enhancement Research skills Analytical Skills Employability in field of GIS

		Entry and Preparation, Point Data Transformation Unit IV: Spatial Data Analysis, Classification of analytical GIS Capabilities, GIS and Application models, Error Propagation in spatial data processing Unit V: Data Visualization, GIS and Maps, The Visualization Process Visualization, Strategies: Present or explore?, Map Cosmetics, Map Dissemination, The cartographic toolbox	
Enterprise Networking	RJSUIT605	Unit I:General Network Design, Network Design Models Unit II: Enterprise LAN Design, Data Center Design Unit III:Wireless LAN Design, WAN Technologies and the Enterprise Edge, WAN Design Unit IV:Internet Protocol Version 4,case Study, Internet Protocol Version 6 Unit V:Managing Security	 Skill Enhancement Logical reasoning skills Analytical Skills
IT Service Management	RJSUIT606	Unit I :IT Service Management, Service Strategy Principles, Service Strategy, Challenges, Critical Success factors and risks Unit II: Service Design, Service Design Principles, Service Design Processes, Challenges, Critical Success factors and risks Unit III :Service Transition, Service Transition Principles, Service Transition Processes, Challenges, Critical Success	 Skill Enhancement Logical reasoning skills Analytical Skills Employability in the field of IT service management

		factors and risks Unit IV:Service Operation, Service Operation Principles, Service Operation Processes, Challenges, Critical Success factors and risks Unit V:Continual Service Improvement(CSI) Principles, CSI Process, CSI Methods and Techniques, Organising for CSI, Technology considerations, Implementing CSI	
Cyber Laws	RJSUIT607	Unit I :Power of Arrest Without Warrant Under the IT Act, 2000, Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000 Unit II: Contracts in the Infotech World, Jurisdiction in the Cyber World Unit III :Battling Cyber Squatters and Copyright Protection in the Cyber World Unit IV :E-Commerce Taxation: Real Problems in the Virtual World, Digital Signature, Certifying Authorities and E- Governance Unit V :The Indian Evidence Act of 1872 v. Information Technology Act, 2000, Protection of Cyber Consumers in India	 Skill Enhancement Analytical Skills Writing skills Research skill Employability in field of cyber laws as cyber laws expert
Software Quality Assurance Practical usi tools –	RJSUITP601	Manual Testing Automation Testing using Selenium- IDE, WebDriver, AutoIT and WAPT	 Skill Enhancement Logical reasoning skills Analytical Skills

Selenium, AutoIT			4. Testing skills5. Problem solving skills
Security in Computing Practical	RJSUITP602	Implementation of computer security	 Skill Enhancement Logical reasoning skills Analytical Skills
Business Intelligence Practical	RJSUITP603	Building Business analysis solutions	 Skill Enhancement Logical reasoning skills Analytical Skills Problem solving skills
Principles of Geographic Information Systems Practical	RJSUITP604	Implementation of GIS principles	 Skill Enhancement Logical reasoning skills Analytical Skills
Enterprise Networking Practical	RJSUITP605	Implementing network models	 Skill Enhancement Logical reasoning skills Analytical Skills
Project Viva Voce	RJSUITP606	Implementation of the software project	 Skill Enhancement Logical reasoning skills Analytical Skills Team building skills