



Hindi Vidya Prachar Samiti's  
**Ramniranjan Jhunjhunwala College of Arts, Science  
& Commerce (Autonomous), Ghatkopar (W)**



Affiliated to  
**University of Mumbai**

**Syllabus Framework as per LOCF**

**Program: M.Sc. Information Technology**  
**Program Code: RJSPIT**

**Choice Based Credit System Syllabus**

*(With effect from the academic year 2019-20)*

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## **The Preamble**

### ***Why IT?***

The world around us is rapidly changing! The change is carried by the technology. Information Technology has become the fourth basic need of human after food, shelter and clothing. Be it buying essentials online; connecting to friends and family; online learning or entertainment; IT is integral part of normal life. The increasing popularity and luxury turning into necessity has created a large number of opportunities in the field of Information Technology. Information Technology is an application-oriented program where students learn core technologies and apply their skills in developing solutions for different problems in a variety of domains. The applications may lead students to master a niche skill and bag a unique career opportunity.

### ***Why IT at R J College?***

Department of IT was established in the year 2007-08. Since its inception, department has been centering attention of the college with vibrant activities and several success stories of the students. Strength of the department is talented, experienced faculty members, state of the art laboratories, rich in resource departmental library, hardworking students and a very strong industrial connect. The PG program started in the year 2016 and has received excellent response. In the journey of 15 years, students of department of IT secured top rank in university examinations in both UG and PG programs. Department of Biotechnology (DBT), New Delhi has granted DBT star scheme grant to the department of Information Technology jointly with department of Computer Science. At RJIT, a special attention is given to the overall grooming of the students and making them industry – ready.

TechConnect is an initiative of the department where expert alumni members share their expertise and experiences with the students. Communication skill of the students is polished through various activities including presentations of case studies and project work. RJIT hosts an intercollegiate TechFest, “Symposium” every alternate year, where students get a good opportunity to develop leadership qualities, organizing skills and showcase their talent. Faculty being the core strength of the education system, there have been many collaborations with giants like Patni computers for strengthening our faculty in the past. Faculty members regularly undergo trainings on different new technologies to keep up with ever changing, dynamic IT field.

### ***Our Curriculum Your Strength***

As part of the Autonomous Institution, the Department of Information Technology has revised the syllabus of M.Sc. IT as per the Choice Based Credit System (CBCS) and the industry requirements, to be implemented from the academic year 2019-20. It is believed that the proposed syllabus will offer the Post Graduates an enriched learning experience, quality skills, ability to create solutions to real world problems and understand the effects of computer systems on the people and society. The major areas that are focused throughout the

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program are Data Science, Artificial Intelligence, Virtualization, Cloud Computing, Networking, Big Data Analytics, Computer Forensics, Blockchain technologies, Virtual & Augmented Reality and Robotics.

To see how theoretical aspects learned in classes are integrated into the practical world, we facilitate experiential learning in the form of Case Study and Project. This will help fresh pass out students in gaining on-floor experience. The skills acquired during the program would help post graduates to land a decent job in an IT sector.

The students would also be encouraged to write a research paper and improve the presentation and leading skills every semester and earn credits for the same. We make it a point to train our students, regardless of their domain, using the best methods possible to master the concepts and help to build a successful career in the various sectors of Information Technology.

Furthermore, continuous assessment is an integral part of the evaluation, which will facilitate systematic and thorough learning towards a better understanding of the subject to the students.

## **Program Outcome**

Students of all Post graduate degree program on completion of the program will be able to

### ***Convey the concept clearly***

Students would have clarity and complete domain knowledge. Shall be able to analyze solve, innovate and convey the concept clearly by utilizing effective communication skills

### ***Social Interaction***

Respect each other and should be able to resolve conflicts and help in reaching amicable solution. They should be able to work in diverse teams. They should be able to distinguish when and what is socially acceptable. Students would perform functions that demand higher competence in national/international organizations with positive spirit and cooperate with peer. Provide leadership and be mentors.

### ***Responsible citizen***

Contribute to Nation development through social service. Being empathetic and sympathetic to fellow beings.

### ***Honesty and Integrity, Ethics***

Recognize different values and systems and respect them. In decision making moral values should be given prime importance. Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty.

### ***Environmental and Sustainability***

Environmental issues would be considered and problem solving with sustainable development would be chosen.

### ***Life Long learning and Global thinking***

Enjoy learning in every situation and should have skills for adapting in any part of the world and contribute to nation building globally.

## Program Specific Outcomes

The increasing popularity and luxury turning into necessity has created a large number of opportunities in the field of Information Technology. Information Technology is an application-oriented program where students learn core technologies and apply their skills in developing solutions for different problems in a variety of domains. It is believed that the syllabus will offer the Post Graduates an enriched learning experience, quality skills, ability to create solutions to real world problems and understand the effects of computer systems on the people and society. The major areas that are focused throughout the program are Data Science, Artificial Intelligence, Virtualization, Cloud Computing, Networking, Big Data Analytics, Computer Forensics, Blockchain technologies, Virtual & Augmented Reality and Robotics.

To see how theoretical aspects learned in classes are integrated into the practical world, we facilitate experiential learning in the form of Case Study and Project. This will help fresh pass out students in gaining on-floor experience. The skills acquired during the program would help post graduates to land into a decent job in an IT sector, education sectors and startups/entrepreneurship. The students would also be encouraged to write a research paper and improve the presentation skills every semester and earn credits for the same.

All the courses in the program are carefully designed to equip the students for professional certifications and competitive exams like aptitudes, GATE, NET, SET etc. and to write research proposals for grants.

PSO1	<b>Demonstrate</b> and <b>Use</b> the competency on topics like Data Collection, Preparation and Pre-processing, Data Transformation, Calculating Descriptive Statistics, Exploratory Data Analysis, Probability and Probability Distributions, Estimating Statistical Parameters, Hypothesis Testing, Building and Evaluating the Statistical Models.
PSO2	<b>Describe</b> and <b>Understand</b> characteristics, process and communication of distributed systems. <b>Manage</b> clock synchronization and consistency with systems. <b>Handle</b> replication, fault tolerance and enhance security of systems. <b>Explore</b> various types of distributed systems
PSO3	<b>Apply</b> the various techniques of Image and Vision Processing in the field of Graphics and Artificial Intelligence. <b>Detect</b> and <b>Analyze</b> images in the frequency domain using various transforms, spatial filters, compression techniques.
PSO4	<b>Understand</b> and <b>Describe</b> the necessary theoretical background for Cloud

	Computing Environments. <b>Gain</b> insight on the methodologies and technologies for the development of applications that will be deployed and offered through Cloud Computing Environments. <b>Apply</b> the knowledge on building cloud infrastructures by using IaaS software and <b>Developing</b> cloud applications by utilizing PaaS software.
PSO5	<b>Understand</b> , <b>Describe</b> and <b>Apply</b> the various concepts and basic and some advanced algorithms of Artificial Intelligence. <b>Remember</b> and <b>Use</b> knowledge representation issues and using predicate logic and production rules. <b>Understand</b> and <b>Apply</b> techniques that could be augmented to support non-monotonic reasoning, statistical technique, semantic network, frame and scripts.
PSO6	<b>Describe</b> the fundamentals of MAC Protocols. To <b>Explore</b> Routing Protocols for Wireless Sensor Networks. <b>Understand</b> the Transport Control Protocols for WSN. <b>Explore</b> Network Management requirements and its Performance and Traffic Management. <b>Understand</b> Operating Systems for Wireless Sensor Networks.
PSO7	<b>Understand</b> the key issues in big data management and analysis, <b>Analyze</b> data by utilizing various statistical and data mining techniques/algorithms, <b>Perform</b> analytics on real-time streaming data and <b>Understand</b> the various NoSQL alternative database models. Use the Big Data Frameworks Hadoop, Map Reduce and NO SQL for big data analytics as well.
PSO8	<b>Understand</b> and <b>Use</b> VMWare vSphere 6.0, Install and Configure ESXi server, <b>Understand</b> , <b>Install/Configure</b> vSphere Centre, <b>Configure</b> and <b>Manage</b> the Resource Allocation, Storage Devices, vSphere Update Manager and vSphere Security. <b>Create</b> a vSphere Network as well.
PSO9	<b>Understand</b> and <b>Use</b> the various types of Neural Networks for the deep learning applications. <b>Building</b> and <b>Evaluating</b> the neural network models.
PSO10	<b>Understand</b> basic concepts in robotics and <b>analyze</b> forward and reverse kinematics to robotic movements. <b>Learn</b> , <b>apply</b> and <b>demonstrate</b> application of Jacobian and its solution. <b>Study</b> , <b>Compare</b> and <b>Visualize</b> different sensors, effectors and grippers in robotics.
PSO11	<b>Describe</b> and <b>Use</b> the concepts of computer forensics and investigation process. <b>Understand</b> and <b>Analyze</b> storage devices, web attacks, operating systems, networks, databases, cloud storage, malwares and mobile devices. <b>Use</b> software tools for data acquisition, imaging, analyzing and reporting the forensic evidence. <b>Understand</b> and <b>Describe</b> anti-forensic techniques.
PSO12	<b>Understand</b> and <b>Describe</b> AWS Fundamentals, Architecture, Virtual Private Cloud, Load balancing and Scaling techniques. <b>Describe</b> and <b>Use</b> the various techniques like Authorization, Authentication, Cloud Services and Relational Management Database Systems. <b>Describe</b> and <b>Use</b> the AWS Security and Resource Management features.
PSO13	<b>Understand</b> and <b>Use</b> the various text processing techniques. Perform the Lexical, Syntactic, Semantic, etc. analysis.
PSO14	<b>Understand</b> and <b>Analyze</b> existing network protocols and networks. <b>Describe</b>

	Software Defined Network concepts, architecture and ecosystem. <b>Develop</b> protocols in networking like OpenFlow and <b>Study</b> OpenFlow agents.
PSO15	<b>Understand</b> and <b>Apply</b> the various techniques of Virtual and Augmented Reality in real life. <b>Reduce</b> the greatest risk to Virtual Reality. Effectively <b>use</b> opensource VR software.
PSO16	<b>Understand</b> the technical aspects of public distributed ledgers, blockchain systems, cryptocurrencies, and smart contracts. <b>Learn</b> how these systems are built. <b>Design</b> and <b>Build</b> secured distributed applications.
PSO17	<b>Apply</b> the concepts, tools and Techniques to the specific application, that use learnt during the program. <b>Design, Develop, Test</b> and <b>Deploy</b> the project into the required environment.



**Table of mapping course learning outcomes to program learning outcomes**

	<b>Course Code</b>	<b>Core Competency</b>	<b>Critical Thinking</b>	<b>Analytical</b>	<b>Research Skills</b>	<b>Problem Solving</b>	<b>Team Work</b>
Msc IT Semester I	RJSPIT101	√	√	√	√	√	√
	RJSPIT102	√	√	√	√	√	√
	RJSPIT103	√	√	√	√	√	√
	RJSPIT104	√	√	√	√	√	√
	RJSPIT1P1	√	√	√	√	√	√
	RJSPIT1P2	√	√	√	√	√	√
	RJSPIT1P3	√	√	√	√	√	√
	RJSPIT1P4	√	√	√	√	√	√
Msc IT Semester II	RJSPIT201	√	√	√	√	√	√
	RJSPIT202	√	√	√	√	√	√
	RJSPIT203	√	√	√	√	√	√
	RJSPIT204	√	√	√	√	√	√
	RJSPIT2P1	√	√	√	√	√	√
	RJSPIT2P2	√	√	√	√	√	√
	RJSPIT2P3	√	√	√	√	√	√
	RJSPIT2P4	√	√	√	√	√	√
Msc IT Semester III	RJSPIT301	√	√	√	√	√	√
	RJSPIT302	√	√	√	√	√	√
	RJSPIT303	√	√	√	√	√	√
	RJSPIT304	√	√	√	√	√	√
	RJSPIT3P1	√	√	√	√	√	√
	RJSPIT3P2	√	√	√	√	√	√
	RJSPIT3P3	√	√	√	√	√	√
	RJSPIT3P4	√	√	√	√	√	√
Msc IT Semester IV	RJSPIT401	√	√	√	√	√	√
	RJSPIT402	√	√	√	√	√	√
	RJSPIT403	√	√	√	√	√	√
	RJSPIT404	√	√	√	√	√	√

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	RJSPIT405	√	√	√	√	√	√
	RJSPIT4P1	√	√	√	√	√	√
	RJSPIT4P2	√	√	√	√	√	√

## **Teaching Learning Process**

The teaching learning process in the learning outcomes-based curriculum framework in the subject of Information Technology is designed to help students to learn the subject in greater details, analyze and apply as and when required. The course offers the requisite skills for a professions and jobs in Information Technology. All courses have practical and hands-on sessions an integral part which promotes the learner to acquire the requisite skills for employment by experiential learning. Teaching also involves guest lectures by experts drawn from research institutes of repute, industries, and entrepreneurs.

An interesting combination of teaching learning processes is adopted in which the teacher and learners are actively involved.

### **Some of the salient teaching learning processes are**

- Class lectures
- Hands-on sessions
- Presentations
- Group Discussion, workshops
- Peer teaching and learning
- Flipped classroom, project-based learning, quiz, seminars, exhibitions, posters
- Practical's experimental design planning, analysis, interpretation, application of knowledge gained
- Major Project
- Technology enabled self-learning

The effective teaching strategies would address the requirements of learner to learn at their own pace. Self-learning is encouraged at postgraduate level emphasis is on acquiring higher order skills. The entire program is also designed to foster the technical skills as per the industry requirement. The teaching learning processes adopted would aim at participatory pedagogy.