



Rajiv Gandhi Institute of Petroleum Technology, Jaipur

(राजीव गांधी पेट्रोलियम प्रौद्योगिकी संस्थान, जायस)

Department of Mathematical Sciences

(गणितीय विज्ञान विभाग)

B.Tech. in Mathematics and Computing

Programme reflection

Mathematics and computing have an unprecedented rate of growth followed by many career opportunities in areas of programming including artificial intelligence, system data analysis and design, managing computer-based software and resources, financial sector. The scope of this course is quite wide and provides a wide range of career paths and recruitments from prestigious Institutions or companies of private as well as government globally.

The programme offers specialization in mathematical modelling and simulation, artificial intelligence and financial mathematics and thus produces manpower equipped with multiple skills in mathematics, computer science and financial mathematics trained by a group of highly qualified faculty.

Why @RGIPT?

- The institute is committed to produce highly qualified manpower keeping in mind the future trend in the study of mathematics and computing which are Artificial Intelligence, Robotics Technology, Mathematical modelling in Technology, Modern machine learning, data analytics etc.
 - Due to the association with the ministry of petroleum and natural gas, high possibility of on-campus recruitment in various PSUs like ONGC, IOCL, BPCL etc and other reputed industries.
 - The course is designed in a such a way that a student can choose from a long list of careers like banker, financial analyst, consultant, software developer, computer engineer, business advisor etc. by opting one of the three streams offered after 2nd year.
 - The programme is run by a team of committed faculty with PhD degree and post-doctoral experience from top institutes in India and abroad.
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Framework of the 4-Year B.Tech. Program in
Mathematics and Computing

Semester-wise Course Structure:

Semester 1 (I Year: Odd Sem)

Course/Subject	L	T	P	Cr
Classical Physics (IS)	3	1	0	11
Inorganic & Physical Chemistry (IS)	3	1	0	11
Real Analysis & Calculus (IS)	3	1	0	11
Computer Programming (IE)	3	1	2	13
Biology (IS)	2	1	0	8
Chemistry Lab (IS)	0	0	2/2	1
Physics Lab (IS)	0	0	2/2	1
Engineering Graphics (EP)	0	0	3	3
Total Credits				59
Basic English (HU)*	1	2	0	7
Universal Human Values (HU)	1	1	0	5

*For students with less proficiency in English

Semester 2 (I Year: Even Sem)

Course/Subject	L	T	P	Cr
Modern Physics (IS)	2	1	0	8
Differential Equations (IS)	3	1	0	11
Engineering Thermodynamics (IE)	3	1	0	11
Fundamentals of Electronics Engineering (IE)	3	1	2	13
Engg. Practices in Mathematics & Computing (EP)	1	0	2	5
Chemistry Lab (IS)	0	0	2/2	1
Physics Lab (IS)	0	0	2/2	1
Workshop Practices (EP)	0	0	3	3
Total Credits				53
Community Internship (HU)	0	0	5	5

Semester 3 (II Year: Odd Sem)

Course/Subject	L	T	P	Cr
Linear Algebra & Complex Analysis (IS)	2	1	0	8
Discrete Mathematics (DC/CSE)	3	0	0	9
Data Structure & Algorithms (IE/CSE)	3	0	2	11
Graphics & Visual Computing (DC/CSE)	2	0	2	8
Programming with Python (DC/CSE)	1	0	2	5
Elementary Number Theory & Algebra (DC)	3	1	0	11
Total Credits				52

Semester 4 (II Year: Even Sem)

Course/Subject	L	T	P	Cr
Database Management Systems (DC/CSE)	3	0	2	11
Computer Organization and Architecture (DC/CSE)	3	0	0	9
Numerical Methods (IS)	2	1	0	8
Statistical Methods and Data Analysis (IS)	2	1	0	8
Web Technology (IE/CSE)	3	0	2	11
Financial Engineering-I (DC)	3	0	0	9
Total Credits				56

Semester 5 (III Year: Odd Sem)

Course/Subject	L	T	P	Cr
Operating Systems (DC/CSE)	3	0	2	11
Functional Analysis & Topology (DC)	3	0	0	9
Computational PDEs (DC)	3	0	0	9
DE-1 (DE)	3	0	0	9
Theory of Computation (DC/CSE)	3	0	0	9
B.Tech. Project-I (DP)	0	0	10	10
Total Credits				57
Summer Internship/ Industrial Visit	0	0	5	5

Semester 6 (III Year: Even Sem)

Course/Subject	L	T	P	Cr
Design and Analysis of Algorithms (DC/CSE)	3	0	2	11
Computer Networks (DC/CSE)	3	0	2	11
Optimization Methods & Applications (DC)	3	0	0	9
Stochastic Processes (DC)	3	0	0	9
DE-2 (DE)	3	0	0	9
B.Tech. Project-II (DP)	0	0	10	10
Total Credits				59

Semester 7 (IV Year: Odd Sem)

Course/Subject	L	T	P	Cr
Graph Theory (DC)	3	0	0	9
DE-3 (DE)	3	0	0	9
OE-1 (OE)	3	0	0	9
L/M-1	3	0	0	9
HSS	3	0	0	9
B.Tech. Project-III (DP)	0	0	10	10
Total Credits				55

Semester 8 (IV Year: Even Sem)

Course/Subject	L	T	P	Cr
Soft Computing (DC/CSE)	2	0	2	8
Data Mining (DC/CSE)	2	0	2	8
DE-4 (DE)	3	0	0	9
OE-2 (OE)	3	0	0	9
L/M-2	3	0	0	9
Total Credits				43

Streams in Mathematics and Computing:

	Mathematical Modeling & Simulation	Artificial Intelligence (CSE)	Financial Mathematics
DE-1	Mathematical Modeling of Dynamical System	Artificial Intelligence	Mathematical Finance
DE-2	Computational Fluid Dynamics	Deep Learning or Genetic Algorithm	Financial Engineering-II
DE-3	Data Analytics	Data Analytics	Computational Finance
DE-4	Reservoir Simulation	Computer Vision & Pattern Recognition	Financial Management

Open Electives:

A tentative list of Open Electives (OE) is given below. More elective courses will be included/updated in future.

1. Software Engineering. (CSE, Sem-V)
2. Compiler Design. (CSE, Sem-VI)
3. Mobile Computing (CSE, Sem-VII)
4. Digital Image Processing. (CSE, Sem-VIII)
5. Management Accounting. (MBA, Sem-I)
6. Managerial Economics. (MBA, Sem-I)
7. Business Analytics. (MBA, Sem-II)
8. Financial Derivatives. (MBA, DE)
9. Security Analysis & Portfolio Management. (MBA, DE)
10. Project Finance. (MBA, DE)
11. International Finance. (MBA, DE)
12. Management of Financial Services. (MBA, DE)
13. Financial Risk Management. (MBA, DE)
14. Corporate Finance. (MBA, DE)
15. Modern Coding Theory (EC, DE)
16. Modeling, Simulation and Optimization (CEBE, Sem-VIII)

Outcomes of the Programme

- The graduates are expected to develop an ability to apply knowledge of *mathematics*, *computer science* and *engineering* appropriate to the discipline.
- Apply the fundamentals of mathematics, science and engineering knowledge to understand, analyze and develop computer programs in the areas related to artificial intelligence, mathematical modelling and financial mathematics.
- The graduates should have ability to identify, formulate and solve real engineering/scientific problems and understand the global impact of engineering solutions.

Future Prospects

With the increasing demand for a profession in the field of Mathematics and computing, the following have been planned.

- Artificial Intelligence
- Robotics Technology
- Mathematical modelling in Technology
- Modern computing mathematics study
- Advanced Data Analytics
- Modern machine learning
- The Bureau of Meteorology

On successful completion of the degree, students can find a job in various government and private sectors, which includes consulting engineering firms, telecom industries, bank and insurance companies and software industries. Moreover, they can also get research opportunities in data mining, computer graphics, stochastic processes, machine learning and of course various areas in mathematics (modeling, simulation, finance).