

Semester-wise Course Structure

(Program: B.Tech. in Mathematics & Computing)

Semester 1 (I Year: Odd Sem)

Course/Subject	L	T	P	Cr
Classical Physics (IS) (PY111)	3	1	0	11
Inorganic & Physical Chemistry (IS) (CY111)	3	1	0	11
Real Analysis & Calculus (IS) (MA 111)	3	1	0	11
Computer Programming (IE) (CS101)	3	1	2	13
Biology (IS) (BY101)	2	1	0	8
Chemistry Lab (IS) (CY111L)	0	0	2/2	1
Physics Lab (IS) (PY111L)	0	0	2/2	1
Engineering Graphics (EP) (ME121)	0	0	3	3
Total Credits				59
Basic English (HU)* (LM101)	1	2	0	7
Universal Human Values (HU) (HU101)	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) (PY112)	2	1	0	8
Differential Equations (IS) (MA121)	3	1	0	11
Engineering Thermodynamics (IE) (CH161)	3	1	0	11
Fundamentals of Electronics Engineering (IE) (EC111)	3	1	2	13
Engg. Practices in Mathematics & Computing (EP)	1	0	2	5
Chemistry Lab (IS) (CY121L)	0	0	2/2	1
Physics Lab (IS) (PY121L)	0	0	2/2	1
Workshop Practices (EP) (ME131)	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) (MA 211)	2	1	0	8
Discrete Mathematics (DC/CSE) (CS201)	3	0	0	9
Data Structure & Algorithms (IE/CSE) (CS211)	3	0	2	11
Graphics & Visual Computing (DC/CSE) (CS231)	2	0	2	8
Programming with Python (DC/CSE) (CS221)	1	0	2	5
Elementary Number Theory & Algebra (DC) (MA 212)	3	1	0	11
Total Credits				52

Semester 4 (II Year: Even Sem)

Course/Subject	L	T	P	Cr
Database Management Systems (DC/CSE) (CS212)	3	0	2	11
Computer Organization and Architecture (DC/CSE) (CS211)	3	0	0	9
Numerical Methods (IS) (MA 221)	2	1	0	8
Statistical Methods and Data Analysis (IS) (MA 231)	2	1	0	8
Web Technology (IE/CSE)	3	0	2	11
Financial Engineering-I (DC) (MA 241)	3	0	0	9
Total Credits				56

Semester 5 (III Year: Odd Sem)

Course/Subject	L	T	P	Cr
Operating Systems (DC/CSE) (CS311)	3	0	2	11
Functional Analysis & Topology (DC) (MA 311)	3	0	0	9
Computational PDE (DC) (MA 321)	3	0	0	9
DE-1 (DE)	3	0	0	9
Theory of Computation (DC/CSE) (CS321)	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) (CS341)	3	0	2	11
Computer Networks (DC/CSE) (CS351)	3	0	2	11
Optimization Methods & Applications (DC) (MA 323)	3	0	0	9
Stochastic Processes (DC) (MA 331)	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) (MA 411)	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) (CS468)	2	0	2	8
Data Mining (DC/CSE) (CS458)	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 (MA 322)	Artificial Intelligence	Mathematical Finance (MA 341)
DE-2	Computational Fluid Dynamics (MA 324)	Deep Learning or Genetic Algorithm	Financial Engineering-II (MA 342)
DE-3	Data Analytics (CS457)	Data Analytics	Computational Finance (MA 441)
DE-4	Reservoir Simulation (MA 421)	Computer Vision & Pattern Recognition	Financial Management (MA 454)

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)

Component Distribution of Credits (B.Tech. Program)

Category	Program components	Min	Max	Recommended
HU	Humanities and social science	15	20	19
IS	Sciences	70	90	88
IE	Institute requirement engineering	40	70	59
EP	Engineering drawing, workshop	18	24	11
LM	Language and management	18	24	18
DC	Departmental core	125	180	165
DE	Departmental elective	30	75	36
OE	Open elective	15	20	18
DP	Project/Industrial visit	20	50	35
	Total	440	470	449

Institute Science Courses (IS):

Course/Subject	L	T	P	Cr
Classical Physics (IS)	3	1	0	11
Real Analysis & Calculus (IS)	3	1	0	11
Biology (IS)	2	1	0	8
Chemistry Lab (IS)	0	0	2	2
Physics Lab (IS)	0	0	2	2
Modern Physics (IS)	2	1	0	8
Inorganic & Physical Chemistry (IS)	3	1	0	11
Differential Equations (IS)	3	1	0	11
Linear Algebra & Complex Analysis (IS)	2	1	0	8
Statistical Methods & Data Analysis (IS)	2	1	0	8
Numerical Methods (IS)	2	1	0	8
Total Credits				88

Institute Engineering Courses (IE):

Course/Subject	L	T	P	Cr
Engineering Thermodynamics (IE)	3	1	0	11
Computer Programming (IE)	3	1	2	13
Fundamentals of Electronics Engineering (IE)	3	1	2	13
Web Technology (IE)	3	0	2	11
Data Structure & Algorithms (IE)	3	0	2	11
Total Credits				59

EP, LM & HU Courses:

	Course/Subject	L	T	P	Cr
EP	Engineering Graphics (EP)	0	0	3	3
	Engineering Practices in Mathematics & Computing (EP)	1	0	2	5
	Workshop Practices (EP)	0	0	3	3
	Total Credits				11
LM	L/M-1	3	0	0	9
	L/M-2	3	0	0	9
	Total Credits				18
HU	Universal Human Values (HU)	1	1	0	5
	Community Internship (HU)	0	0	5	5
	HSS	3	0	0	9
	Total Credits				19

Project/Industry Visit (DP):

Project/industry Visit (DP)				35
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Department Core (DC):

Course/Subject	L	T	P	Cr
Elementary Number Theory & Algebra (DC) (MA 211)	3	1	0	11
Financial Engineering-I (DC) (MA 241)	3	0	0	9
Functional Analysis & Topology (DC) (MA 311)	3	0	0	9
Computational PDE (DC) (MA 321)	3	0	0	9
Optimization Methods & Applications (DC) (MA 323)	3	0	0	9
Stochastic Processes (DC) (MA 331)	3	0	0	9
Graph Theory (DC) (MA 411)	3	0	0	9

Multicore Subjects offered by MA and/or CSE				
Discrete Mathematics (DC/CSE)	3	0	0	9
Graphics & Visual Computing (DC/CSE)	2	0	2	8
Programming with Python (DC/CSE)	1	0	2	5
Database Management Systems (DC/CSE)	3	0	2	11
Computer Organization and Architecture (DC/CSE)	3	0	0	9
Operating Systems (DC/CSE)	3	0	2	11
Theory of Computation (DC/CSE)	3	0	0	9
Design and Analysis of Algorithms (DC/CSE)	3	0	2	11
Computer Networks (DC/CSE)	3	0	2	11
Soft Computing (DC/CSE)	2	0	2	8
Data Mining (DC/CSE)	2	0	2	8
Total Credits				165

Departmental Electives (DE):

Course/Subject	L	T	P	Cr
DE-1	3	0	0	9
DE-2	3	0	0	9
DE-3	3	0	0	9
DE-4	3	0	0	9
Total Credits				36

Open Electives (OE):

Course/Subject	L	T	P	Cr
OE-1	3	0	0	9
OE-2	3	0	0	9
Total Credits				18

References:

IIT Delhi, IIT Guwahati, IIT Kanpur, IIT Ropar, IIT BHU & Delhi Technological University.