

Details of the Swayam NPTEL-MOOC Courses Approved for Department of Mathematics (as on 08-Jan-2025)										
Sl. No	Course Title	Name of the Developer	Name of the Instit	No. of	Course URL	Programme	Speci	Department Elective/Open Elective	Remarks on Open Elective/prerequisite/Eligibility	Senate Meeting
1	Introduction to Queueing theory	Prof. N. Selvaraju	IIT Guwahati	12	https://nptel.ac.in/courses/111103159	BTech (M&C), MSc (M&C), Ph.D.	NIL	Department Elective	For UG/PG, PREREQUISITES : Calculus-based Probability Theory	165, 170
2	Deep Learning	Prof. P. K. Biswas	IIT Kharagpur	12	https://nptel.ac.in/courses/106105215	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Knowledge of Linear Algebra, DSP, PDE will be helpful	166
3	Getting Started with Competitive Programming	Prof. Neeldhara Misra	IIT Gandhinagar	12	https://onlinecourses.nptel.ac.in/noc24_cs29/preview	BTech (M&C)	NIL	Department Elective	For UG, PREREQUISITES : Data Structures and Algorithms, Familiarity with a programming language (ideally C++ or Python)	166, 170
4	Introduction to Machine Learning	Prof. Balaraman Ravindran	IIT Madras	12	https://onlinecourses.nptel.ac.in/noc24_cs51/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : We will assume that the students know programming for some of the assignments. If they do not, they should learn basic programming before the course.	166, 170
5	Blockchain and its Applications	Prof. Sandip Chakraborty, Prof. Shamik Ghosh	IIT Kharagpur	12	https://nptel.ac.in/courses/106105235	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Computer Networks; Operating Systems; Cryptography and Network Security	166, 170
6	Data analytics with python	Prof. A. Ramesh	IIT Roorkee	12	https://nptel.ac.in/courses/106107220	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Nil	166, 170
7	An introduction to Artificial Intelligence	Prof. Mausam	IIT Delhi	12	https://nptel.ac.in/courses/106102220	BTech (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Data Structures, Probability	166, 170
8	Natural Language Processing	Prof. Pawan Goyal	IIT Kharagpur	12	https://onlinecourses.nptel.ac.in/noc23_cs80/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Basic knowledge of probabilities for the lectures and python for programming assignment	166, 170
9	Introduction to internet of things	Prof. Sudip Misra	IIT Kharagpur	12	https://onlinecourses.nptel.ac.in/noc23_cs83/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Nil	166, 170
10	Essentials of Data Science with R software- 1:Probability and Statistical Inference	Prof. Shalabh	IIT Kanpur	12	https://nptel.ac.in/courses/111104146	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : "Introduction to R Course" is preferred. Mathematics background up to class 12 is needed. Some minor statistics background is desirable.	166, 170
11	Cloud Computing	Prof. Soumya Kanti Ghosh	IIT Kharagpur	12	https://onlinecourses.nptel.ac.in/noc24_cs17/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG, PREREQUISITES : Basics of Computer Architecture and Organization, Networking	170
12	Computer Networks and Internet Protocol	Prof. Soumya Kanti Ghosh, Prof. Sandip Chakraborty	IIT Kharagpur	12	https://nptel.ac.in/courses/10610518	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Nil	170
13	Privacy and Security in Online Social Media	Prof. Ponnurangam Kumaraguru	IIIT Hyderabad	12	https://nptel.ac.in/courses/106106146	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Basic / Intermediate programming course. Understanding of Python will be necessary for the course. Should be able to quickly learn APIs, and to collect data from social networks.	170
14	Artificial intelligence: knowledge representation and reasoning	Prof. Deepak Khemani	IIT Madras	12	https://nptel.ac.in/courses/106106140	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Some exposure to formal languages, logic and programming	170
15	Machine learning and Science application	Prof. Balaji Srinivasan, Prof. Ganapathy	IIT Madras	12	https://nptel.ac.in/courses/106106198	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Familiarity with Multivariable Calculus, Linear Algebra, Probability, Statistics. Comfortable with basic programming.	170
16	Reinforcement Learning	Prof. Balaraman Ravindran	IIT Madras	12	https://onlinecourses.nptel.ac.in/noc23_cs100/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Nil	170
17	Software Engineering	Prof. Rajib Mall	IIT Kharagpur	12	https://onlinecourses.nptel.ac.in/noc23_cs122/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES : C Programming, Java or C++ programming	179
18	Cyber Security and Privacy	Prof. Saji K Mathew	IIT Madras	12	https://onlinecourses.nptel.ac.in/noc23_cs127/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES : A core course on Management Information Systems desirable (not mandatory)	179
19	Introduction To Machine Learning - IITKGP	Prof. Sudeshna Sarkar	IIT Kharagpur	8	https://onlinecourses.nptel.ac.in/noc23_cs87/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Basic programming skills (in Python), algorithm design, basics of probability & statistics	179
20	Ethical Hacking	Prof. Indranil Sengupta	IIT Kharagpur	12	https://onlinecourses.nptel.ac.in/noc23_cs75/preview	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG/PG, PREREQUISITES : Basic concepts in programming and networking	179
21	Algebra II	Prof. Sankaran Viswanath, Prof. Amrita	IMSc	12	https://nptel.ac.in/courses/111106151	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Algebra-I (Highly Recommended)	146th IPPC and 180th Senate
22	Algebraic Combinatorics	Prof. Amritanshu Prasad, Prof. Sankaran Viswanath	IMSc	12	https://nptel.ac.in/courses/111106158	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Knowledge of set theory, linear algebra, and algebra at the undergraduate level, basic undergraduate discrete mathematics (induction, graphs, trees, basic counting techniques, recurrence relations, etc.).	146th IPPC and 180th Senate
23	Algebraic Number Theory	Prof. Mahesh Kakde	IISc Bangalore	12	https://onlinecourses.nptel.ac.in/noc25_ma08/preview	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Algebra, Galois theory.	146th IPPC and 180th Senate
24	An Introduction to Hyperbolic Geometry	Prof. Abhijit Pal	IIT Kanpur	12	https://nptel.ac.in/courses/111104164	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Topology, Algebra (Group Theory), Complex Analysis	146th IPPC and 180th Senate
25	An Introduction to Point Set Topology-I	Prof. Anant R Shastri	IIT Bombay	12	https://nptel.ac.in/courses/111101158	MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES: Real Analysis	146th IPPC and 180th Senate
26	Applied Linear Algebra in AI and ML	Prof. Swanand Khare	IIT Kharagpur	12	https://nptel.ac.in/courses/111105165	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Some exposure to Linear Algebra	146th IPPC and 180th Senate
27	Applied Multivariate Statistical Modeling	Prof. Jhareswar Maiti	IIT Kharagpur	12	https://nptel.ac.in/courses/111105091	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG, PG, PREREQUISITES: Basic Knowledge of Probability and Statistics	146th IPPC and 180th Senate
28	Dynamical System and Control	Prof. N. Sukavanam, Prof. D. N. Pandey	IIT Roorkee	12	https://nptel.ac.in/courses/111107118	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG, PG, PREREQUISITES: Basic concepts from Linear Algebra and Ordinary Differential Equations	146th IPPC and 180th Senate
29	High Performance Scientific Computing	Prof. Shivasubramanian Gopalakrishnan	IIT Bombay	12	https://onlinecourses.nptel.ac.in/noc25_ma27/preview	MSc (M&C), PhD	NIL	Department Elective	For PG, PREREQUISITES: Basic course on programming and applied mathematics	146th IPPC and 180th Senate
30	Introduction to Algebraic Geometry and Commutative Algebra	Prof. Dilip P. Patil	IISc Bangalore	12	https://nptel.ac.in/courses/111108136	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Linear Algebra, Algebra-First Course	146th IPPC and 180th Senate
31	Introduction to Galois Theory	Prof. Krishna Hanumanthu	CMI	8	https://nptel.ac.in/courses/111106145	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Linear Algebra, Group Theory, Rings and Fields	146th IPPC and 180th Senate
32	Introduction to Lie Algebras	Prof. R. Venkatesh	IISc Bangalore	12	https://nptel.ac.in/courses/111108414	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: First Course in Linear Algebra	146th IPPC and 180th Senate
33	Advanced Course on Partial Differential Equations-I	Prof. A. K. Nandakumaran, Prof. P. S. Sankaran	IISc Bangalore	8	https://onlinecourses.nptel.ac.in/noc23_ma79/preview	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Measure and Integration, Functional Analysis, PDE	146th IPPC and 180th Senate
34	Advanced Course on Partial Differential Equations-II	Prof. A. K. Nandakumaran, Prof. P. S. Sankaran	IISc Bangalore	8	https://nptel.ac.in/courses/111108412	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Measure and Integration, Functional Analysis, PDE	146th IPPC and 180th Senate
35	Computational Number Theory and Algebra	Prof. Nitin Saxena	IIT Kanpur	12	https://nptel.ac.in/courses/111104138	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG, PG, PREREQUISITES: Preferable but not necessary - Theory of Computation, Algorithms, Algebra	146th IPPC and 180th Senate
36	Computer Networks and Internet Protocol	Prof. Soumya Kanti Ghosh, Prof. Sandip Chakraborty	IIT Kharagpur	12	https://nptel.ac.in/courses/106105183	MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES:	146th IPPC and 180th Senate
37	Cryptography and Network Security	Prof. Sourav Mukhopadhyay	IIT Kharagpur	12	https://nptel.ac.in/courses/106105162	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG, PG, PREREQUISITES: Preferable but not necessary - Theory of Computation, Algorithms, Algebra	146th IPPC and 180th Senate
38	Data Analytics with Python	Prof. A. Ramesh	IIT Roorkee	12	https://nptel.ac.in/courses/106107220	MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES: Nil	146th IPPC and 180th Senate
39	Introduction to Database Systems	Prof. Sreenivasa Kumar	IIT Madras	12	https://nptel.ac.in/courses/106106220	MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES: Discrete Mathematics, Data Structures	146th IPPC and 180th Senate
40	Fundamental of Object Oriented Programming	Prof. Balasubramanian Raman	IIT Roorkee	12	https://onlinecourses.nptel.ac.in/noc25_cs34/preview	MSc (M&C)	NIL	Department Elective	For PG, PREREQUISITES: Nil. However, having a basic understanding of programming concepts will be beneficial.	146th IPPC and 180th Senate
41	Introduction to Industry 4.9 and Industrial Internet of Things	Prof. Sudip Misra	IIT Kharagpur	12	https://nptel.ac.in/courses/106105195	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG, PG, PREREQUISITES: Basic Knowledge of Computer and Internet	146th IPPC and 180th Senate
42	Quantum Algorithms and Cryptography	Prof. Shweta Agrawal	IIT Madras	12	https://nptel.ac.in/courses/106106241	BTech (M&C), MSc (M&C)	NIL	Department Elective	For UG, PG, PREREQUISITES: Theory of Computation, Design and Analysis of Algorithms, Foundations of Cryptography	146th IPPC and 180th Senate
43	Sobalev Spaces and Partial Differential Equations	Prof. S. Kesavan	IMSc	12	https://nptel.ac.in/courses/111106154	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES : MSc Level Real Analysis, Topology, Linear Algebra; Measure Theory, Functional Analysis	146th IPPC and 180th Senate
44	Introduction to Fourier Analysis	Prof. Parasar Mohanty	IIT Kanpur	12	https://nptel.ac.in/courses/111104519	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG/PG, PREREQUISITES : Basic Calculus, Riemann Integration	146th IPPC and 180th Senate
45	Galois Theory	Prof. Dilip Patil	IIT Bombay	12	https://nptel.ac.in/courses/111101117	BTech (M&C), MSc (M&C), MSc (Maths)	NIL	Department Elective	For UG/PG, PREREQUISITES : Linear Algebra ; Algebra – First Course	146th IPPC and 180th Senate
46	Computational Commutative Algebra	Prof. Manoj Kummini	CMI	12	https://nptel.ac.in/courses/111106138	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES : Introduction to basic theory of rings, modules	146th IPPC and 180th Senate
47	Deep Learning - IIT Ropar	Prof. Sudarshan Iyengar, Prof. Padmavathi	IIT Ropar	12	https://nptel.ac.in/courses/106106184	MSc (M&C), PhD	NIL	Department Elective	For PG, PREREQUISITES : Working knowledge of Linear Algebra, Probability Theory. It would be beneficial if the participants have done a course on Machine Learning.	146th IPPC and 180th Senate
48	An Introduction to Point Set Topology-II	Prof. Anant R Shastri	IIT Bombay	12	https://nptel.ac.in/courses/111101160	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Topology/ Point Set Topology-I	146th IPPC and 180th Senate
49	An Introduction to Riemann Surfaces and Algebraic Curves: Complex 1-Tori and Elliptic Curves	Prof. T. E. Venkata Balaji	IIT Madras	12	https://nptel.ac.in/courses/111106044	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Topology, Complex Analysis	146th IPPC and 180th Senate
50	Advanced Complex Analysis Part-1: Zeros of Analytic Functions, Analytic Continuation, Monodromy, Hyperbolic Geometry and the RMT	Prof. T. E. Venkata Balaji	IIT Madras	12	https://nptel.ac.in/courses/111106084	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Real Analysis, Complex Analysis	146th IPPC and 180th Senate
51	Advanced Complex Analysis Part-2: Compactness of Meromorphic Functions in the Spherical Metric, Spherical Derivative, Normality, Theorems of Marty - Zalcman - Montel - Picard - Royden - Schottky	Prof. T. E. Venkata Balaji	IIT Madras	4	https://nptel.ac.in/courses/111106094	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Real Analysis, Complex Analysis	146th IPPC and 180th Senate
52	Representation Theory of General Lie Algebras - IISc Bangalore	Prof. R. Venkatesh	IISc Bangalore	12	https://nptel.ac.in/courses/111108520	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: Abstract Algebra, Linear Algebra	146th IPPC and 180th Senate
53	Category Theory	Prof. Amit Kuber	IIT Kanpur	12	https://nptel.ac.in/courses/111104524	MSc (M&C), MSc (Maths), PhD	NIL	Department Elective	For PG, PREREQUISITES: None but mathematical maturity is necessary. For understanding and appreciating examples, domain-specific knowledge would be required.	146th IPPC and 180th Senate
54	Foundations of Machine Learning	Prof. J. SakethaNath	IIT Hyderabad	12	https://onlinecourses.nptel.ac.in/e-learning/					