

(For Integrated MSc. in Mathematics and Computing)

| Semester/ Session of Study (Recommended) | Level | Category of course | Course Code | Courses | Mode of delivery & credits L-Lecture; T-Tutorial;P-Practicals | | | Total Credits C- Credits |
|--|------------------------|---|---|---------------------------------|--|----------------------|----------------------|-----------------------------|
| | | | | | L (Periods/ week) | T (Periods/ week) | P (Periods/ week) | C |
| FIRST Monsoon | | THEORY | | | | | | |
| | 1 | PC Program Core | MA101 | Calculus-I | 5 | 1 | 0 | 6 |
| | | | MA102 | Real Analysis & Matrix Theory | 5 | 1 | 0 | 6 |
| | | HSS Humanities & Social Sciences | MT123 | Business Communications | 2 | 0 | 2 | 3 |
| | 1 | FS Foundation Sciences | CH111 | Chemistry 6I | 3 | 1 | 0 | 4 |
| | LABORATORIES | | | | | | | |
| | 1 | FS Foundation Sciences | CH112 | Chemistry 6I Lab | 0 | 0 | 3 | 1.5 |
| 1 | MC Mandatory Course | MC101/102/103/104 | Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) | 0 | 0 | 2 | 1 | |
| TOTAL | | | | | | | | 21.5 |
| SECOND Spring | | THEORY | | | | | | |
| | 1 | PC | MA105 | Calculus-II | 5 | 1 | 0 | 6 |
| | | | MA106 | Ordinary Differential Equations | 5 | 1 | 0 | 6 |
| | | FS | CE101 | Environmental Science | 2 | 0 | 0 | 2 |
| | | | PH109 | Physics I | 3 | 1 | 0 | 4 |
| | | GE General Engineering | CS101 | Programming for problem solving | 3 | 1 | 0 | 4 |
| | | LABORATORIES | | | | | | |
| | | FS | PH110 | Physics I Lab | 0 | 0 | 3 | 1.5 |
| | | GE | CS102 | Programming for problem solving | 0 | 0 | 3 | 1.5 |
| MC | MC105/106/107/108 | Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) | 0 | 0 | 2 | 1 | | |
| TOTAL | | | | | | | | 26 |
| GRAND TOTAL FOR FIRST YEAR | | | | | | | | 47.5 |
| THIRD Monsoon | 2 | THEORY | | | | | | |
| | | PC | MA201 | Partial Differential Equations | 5 | 1 | 0 | 6 |
| | | | MA202 | Modern Algebra | 5 | 1 | 0 | 6 |
| | | | CS201 | Data Structure | 3 | 1 | 0 | 4 |
| | | FS | PH111 | Physics 6II | 3 | 1 | 0 | 4 |
| | | LABORATORIES | | | | | | |
| | | PC | CS202 | Data Structure Lab | 0 | 0 | 3 | 1.5 |
| | FS | PH112 | Physics 6II Lab | 0 | 0 | 3 | 1.5 | |
| MC | MC201/202/203/204 | Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) | 0 | 0 | 2 | 1 | | |
| TOTAL | | | | | | | | 24 |

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|--|-------------------|---|------------|--|---|-----|------|-----|
| FOURTH Spring | 2 | THEORY | | | | | | |
| | | PC | MA205 | Complex Analysis | 5 | 1 | 0 | 6 |
| | | | MA206 | Linear Algebra | 5 | 1 | 0 | 6 |
| | | | CS204 | Object Oriented Programming and Design Pattern | 3 | 0 | 0 | 3 |
| | | FS | CH213 | Chemistry II | 3 | 1 | 0 | 4 |
| | | LABORATORIES | | | | | | |
| | | PC | CS205 | Object Oriented Programming and Design Pattern Lab | 0 | 0 | 3 | 1.5 |
| | | FS | CH214 | Chemistry II Lab | 0 | 0 | 3 | 1.5 |
| MC | MC205/206/207/208 | Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) | 0 | 0 | 2 | 1 | | |
| TOTAL | | | | | | | 23 | |
| FIFTH Monsoon | 3 | THEORY | | | | | | |
| | | PC | MA301 | Probability and Statistics | 3 | 1 | 0 | 4 |
| | | | MA303 | Discrete Mathematics | 3 | 1 | 0 | 4 |
| | | | CS 206 | Design and Analysis of Algorithm | 3 | 0 | 0 | 3 |
| | | | CS 203 | Computer System Architecture | 3 | 1 | 0 | 4 |
| | | PE* Program Electives | Dept Codes | PE I ^A (Maths) | 3 | 1 | 0 | 4 |
| | | | Dept Codes | PE II ^B (Maths/CSE) | 3 | 0 | 0 | 3 |
| | | LABORATORIES | | | | | | |
| PC | MA 302 | Probability and Statistics Lab | 0 | 0 | 3 | 1.5 | | |
| | CS 207 | Design and Analysis of Algorithm Lab | 0 | 0 | 3 | 1.5 | | |
| TOTAL | | | | | | | 25 | |
| SIXTH Spring | 3 | THEORY | | | | | | |
| | | PC | MA309 | Optimization Techniques | 3 | 1 | 0 | 4 |
| | | | MA311 | Numerical Techniques | 3 | 1 | 0 | 4 |
| | | | CS 301 | Database Management System | 3 | 0 | 0 | 3 |
| | | | CS 303 | Operating Systems | 3 | 0 | 0 | 3 |
| | | PE* | Dept Codes | PE III ^C (Maths) | 3 | 1 | 0 | 4 |
| | | | Dept Codes | PE IV ^D (Maths/CSE) | 3 | 0 | 0 | 3 |
| | | LABORATORIES | | | | | | |
| PC | MA 310 | Optimization Techniques Lab | 0 | 0 | 3 | 1.5 | | |
| | MA 312 | Numerical Techniques Lab | 0 | 0 | 3 | 1.5 | | |
| | CS 302 | Database Management System Lab. | 0 | 0 | 3 | 1.5 | | |
| TOTAL | | | | | | | 25.5 | |
| *Course Code and Course Name of Program Electives will depend on the choice of the courses from that group. | | | | | | | | |
| Internship (In-house/External) of at least 2 months should be done by the students (Non-credit) during 5th/6th semester. | | | | | | | | |
| Minimum requirement for Degree award of B. Sc. Honours in Mathematics and Computing (1st - 6th Semester) | | | | | | | 145 | |
| SEVENTH Monsoon | 4 | THEORY | | | | | | |
| | | PC | MA 401 | Real Analysis and Measure Theory | 3 | 1 | 0 | 4 |
| | | | MA 402 | Advanced Complex Analysis | 3 | 1 | 0 | 4 |
| | | | IT321 | Soft Computing | 3 | 0 | 0 | 3 |
| | | | CS327 | Computer Graphics | 3 | 0 | 0 | 3 |
| | | PE* | Dept Codes | PE V ^E (Maths) | 3 | 0 | 0 | 3 |
| | | | Dept Codes | PE VI ^F (Maths / CSE) | 3 | 0 | 0 | 3 |
| | | OE* Open Electives | | OE-I | 3 | 0 | 0 | 3 |
| LABORATORIES | | | | | | | | |
| PC | MA 403 | Computing Lab (MAT Lab) | 0 | 0 | 3 | 1.5 | | |
| | CS328 | Computer Graphics Lab | 0 | 0 | 3 | 1.5 | | |
| TOTAL | | | | | | | 26 | |

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|--|-------|---|------------|-------------------------------------|---|-----|----|-----|
| EIGHTH Spring | 4 | THEORY | | | | | | |
| | | PC | MA412 | Topology | 3 | 1 | 0 | 4 |
| | | | MA413 | Stochastic Processes and Simulation | 4 | 1 | 0 | 5 |
| | | | MA414 | Advanced Operation Research | 3 | 1 | 0 | 4 |
| | | | IT305 | Software Engineering | 3 | 0 | 0 | 3 |
| | | PE* | Dept Codes | PE VII ^G (Maths / CSE) | 3 | 0 | 0 | 3 |
| | | OE* | | OE-II | 3 | 0 | 0 | 3 |
| | | LABORATORIES | | | | | | |
| PC | MA415 | Advanced Operation Research Lab. | 0 | 0 | 3 | 1.5 | | |
| | IT306 | Software Engineering Lab | 0 | 0 | 3 | 1.5 | | |
| TOTAL | | | | | | | 25 | |
| NINTH Monsoon | 5 | THEORY | | | | | | |
| | | PC | MA501 | Functional Analysis | 3 | 1 | 0 | 4 |
| | | | MA502 | Number Theory | 3 | 1 | 0 | 4 |
| | | | CS208 | Formal Language and Automata Theory | 3 | 0 | 0 | 3 |
| | | PE* | Dept Codes | PE VIII ^H (Maths / CSE) | 3 | 0 | 0 | 3 |
| | | | Dept Codes | PE IX ^I (Maths / CSE) | 3 | 0 | 0 | 3 |
| | | MC | MT204 | Constitution of India | 2 | 0 | 0 | 0 |
| TOTAL | | | | | | | 17 | |
| TENTH Spring | 5 | RP Research Project / Industry Internship | MA500 | Dissertation | 0 | 0 | 0 | 12 |
| Total | | | | | | | | 12 |
| Minimum requirement for Degree award of Integrated M. Sc. in Mathematics and Computing (1st - 10th Semester) | | | | | | | | 225 |

DEPARTMENT OF MATHEMATICS
PROGRAMME ELECTIVES: PE
OFFERED FOR SEMESTER / LEVEL 5-9

| PE / LEVEL | Level | Code no. | Name of the PE courses | Prerequisites/Co-requisites courses with code | L | T | P | C |
|---|-------|----------|--|---|---|---|---|---|
| PE I^A V Sem. | 3 | MA304 | Integral Equations and Green's Function | MA106, MA201 | 3 | 1 | 0 | 4 |
| | | MA305 | Fuzzy Logic | MA102 | 3 | 1 | 0 | 4 |
| | | MA306 | Special Functions | MA106, MA201 | 3 | 1 | 0 | 4 |
| PE II^B V Sem. | 3 | MA307 | Integral Transforms and Applications | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA308 | Difference Equations | MA102, MA106, MA201 | 3 | 0 | 0 | 3 |
| | | CS322 | Simulation and Modelling | | 3 | 0 | 0 | 3 |
| | | IT321 | Bio Inspired Computing | | 3 | 0 | 0 | 3 |
| PE III^C VI Sem. | 3 | MA313 | Combinatorics | MA303 | 3 | 1 | 0 | 4 |
| | | MA314 | Tensor Analysis | MA105 | 3 | 1 | 0 | 4 |
| | | MA315 | Statistical Quality Control and Reliability | MA301 | 3 | 1 | 0 | 4 |
| PE IV^D VI Sem. | 3 | MA316 | Computational Linear Algebra | MA101, MA105 | 3 | 0 | 0 | 3 |
| | | MA317 | Financial Mathematics | MA301 | 3 | 0 | 0 | 3 |
| | | MA318 | Wavelet Transform | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA319 | Artificial Neural Network | MA102, MA105, MA301 | 3 | 0 | 0 | 3 |
| | | IT322 | Cloud Computing | | 3 | 0 | 0 | 3 |
| | | CS325 | Database Modelling | | 3 | 0 | 0 | 3 |
| PE V^E VII Sem. | 4 | MA404 | Mathematical Epidemiology | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA405 | Mathematical Modelling | MA106, MA201, MA301 | 3 | 0 | 0 | 3 |
| | | MA406 | Computational Combinatorics | MA303 | 3 | 0 | 0 | 3 |
| | | MA407 | Survey Sampling | MA301 | 3 | 0 | 0 | 3 |
| PE VI^F VII Sem. | 4 | MA408 | Theory of Elasticity | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA409 | Design of Experiments | MA301, MA407 | 3 | 0 | 0 | 3 |
| | | MA410 | Differential Geometry | MA105 | 3 | 0 | 0 | 3 |
| | | MA411 | Computational Mathematics | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | IT401 | Data Analysis and Interpretation | -- | 3 | 0 | 0 | 3 |
| | | CS420 | Advanced Data Structure | CS201 | 3 | 0 | 0 | 3 |
| PE VII^G VIII Sem. | 4 | MA416 | Statistical Inference | MA301 | 3 | 0 | 0 | 3 |
| | | MA417 | Numerical Solutions of Boundary Value Problems | MA106, MA201, MA311 | 3 | 0 | 0 | 3 |
| | | MA418 | Mechanics | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA419 | Mathematical Ecology | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | IT426 | Data Mining Concepts and Techniques | -- | 3 | 0 | 0 | 3 |
| | | CS421 | Parallel Computing | -- | 3 | 0 | 0 | 3 |

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|--|---|-------|--|---------------------------|---|---|---|---|
| PE VIII^H IX Sem. | 5 | MA503 | Statistical Computing | MA301 | 3 | 0 | 0 | 3 |
| | | MA504 | Finite Element Methods | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA505 | Calculus of Variations and Optimal Control | MA106, MA201, MA309 MA418 | 3 | 0 | 0 | 3 |
| PE IX^I IX Sem. | 5 | MA506 | Advanced Difference Equations | MA102, MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA507 | Computational Fluid Dynamics | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | MA508 | Qualitative Theory of Differential Equations | MA106, MA201 | 3 | 0 | 0 | 3 |
| | | IT330 | Cryptography & Network Security | -- | 3 | 0 | 0 | 3 |
| | | CS370 | Cyber Crime and Investigation | -- | 3 | 0 | 0 | 3 |
| | | CS371 | Genetic Algorithm | -- | 3 | 0 | 0 | 3 |

DEPARTMENT OF MATHEMATICS
OPEN ELECTIVES (OE)*
OFFERED FOR LEVEL UG & PG

| Programme | Level | Code no. | Name of the Courses | Prerequisites Courses with code | L | T | P | C |
|--------------|----------|----------|---|---------------------------------|---|---|---|---|
| UG/MO | 3 | MA304 | Integral Equations and Green's Function | NIL | 3 | 1 | 0 | 4 |
| | | MA305 | Fuzzy Logic | NIL | 3 | 1 | 0 | 4 |
| | | MA306 | Special Functions | NIL | 3 | 1 | 0 | 4 |
| | | MA307 | Integral Transforms and Applications | NIL | 3 | 0 | 0 | 3 |
| | | MA308 | Difference Equations | NIL | 3 | 0 | 0 | 3 |
| PG/MO | 4 | MA407 | Survey Sampling | NIL | 3 | 0 | 0 | 3 |
| | | MA411 | Computational Mathematics | NIL | 3 | 0 | 0 | 3 |
| | | MA428 | Numerical and Statistical Methods | NIL | 3 | 0 | 0 | 3 |
| | | MA430 | Discrete Mathematical Structure | NIL | 3 | 0 | 0 | 3 |

*** OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS**

DEPARTMENT OF MATHEMATICS
UG COURSE for BTech, BArch, IMSc Physics, Chemistry and Food Technology
OFFERED FOR LEVEL 1-4

| Semester | Level | Programme | Code No. | Name of the courses | Prerequisites courses with code | L | T | P | C |
|---------------|----------|-----------|----------|---------------------------|---------------------------------|---|---|---|---|
| First | 1 | BE | MA103 | Mathematics I | NIL | 3 | 1 | 0 | 4 |
| | | BArch | MA104 | Mathematics for Architect | NIL | 3 | 0 | 0 | 3 |
| Second | 1 | BE | MA107 | Mathematics II | NIL | 3 | 1 | 0 | 4 |
| | | IMSc | MA108 | Mathematics III | NIL | 5 | 1 | 0 | 6 |
| Third | 2 | BE | MA203 | Numerical Methods | NIL | 2 | 0 | 0 | 2 |
| | | | MA204 | Numerical Methods Lab. | NIL | 0 | 0 | 2 | 1 |
| | | | MA303 | Discrete Mathematics | NIL | 3 | 1 | 0 | 4 |
| Fourth | 2 | IMSc | MA207 | Mathematics IV | NIL | 5 | 1 | 0 | 6 |