

**SCHEME OF B.Sc. (HONS) PHYSICS 2019-22**

Sem	Course 1	Course 2	Course 3	Course 4	Course 5	Course 6	GP	Cont hrs	Credits
I	Waves & Oscillations PYL 101 (3-0-0)3	Mathematical Physics I PYL 104 (3-1-0)4	Applied Mechanics PYL 103 (3-1-0)4	Electricity and Magnetism PYL 105 (3-0-2)4	Effective Communication-I CLL 101 (1-0-2) 2	Engg. Chemistry CHL150 (2-0- 2)3	PYR100 1	23	21
II	Optics PYL 102 (3-1-2) 5	Leadership SML150 (2 1 0) 3	Solid State Physics PYL 106 (3-0-2) 4	Quantum Mechanics PYL 108 (3-0-0)3	Effective Comm.-II CLL 102 (1-0-2)2		PYR110 1	20	18
III	Electromagnetic Theory PYL 201 (3-0-2) 4	Thermal Physics PYL203 (3-0-2) 4	Statistical Mechanics PYL 205 (3-1-0) 4	Prog . Elec. I Lasers/ Nuclear, Particle and Astro physics/ Fundamentals of Electronic Communication PYL110 (3-1-0)4	EVS CH100 (3-0-0) 3	Open Elective I (3) 3	PYR200 1	24	23
IV	Atomic and Molecular Physics PYL204 (3-1-2) 5	Entrepreneurship SML300 (2 1 0) 3	Prog .Elec. II Non Linear Optics/Biophysics/ Polymer Composites ASL 310 (3-0-2)4	Open Elective II (3)3	CLL 120 Human Values (2-0-0)2	Foreign Language Elective (1 2 0)3	PYR220 1	22	21
V	Numerical Analysis MAL310 (3-0-2) 4	Digital Electronics PYL 301 (3-1-2) 5	Prog .Elec.III (MOOC) Experimental and analytical Techniques/Fiber Optics/Microprocessor PYL303 (3-0-2)4	Open Elective III (3)3	Mathematical Physics II PYL202 (3-1-0) 4		PYR300 1	23	21

VI	Nuclear and Particle Physics PYL 302 (3-1-0)4	Electronic Devices PYL 304 (3-1-0)4	Prog . Elec. IV (MOOC) Optical Communication /Thin films and Nanomaterials (3-0-2)4	Open Elective IV (3)3	Project (0-0-6)3	Creativity and innovation outcome (1) PYL 310	PYR330  1	16	20
<b>Total</b>								<b>123</b>	<b>124</b>

## **Highlights of BSc(H)Physics Program**

BSc (H)Physics is one of the most popular program among science students. This program includes Optics, Mathematical Physics, Electricity and Magnetism, Mechanics, Solid State Physics, Electromagnetic theory, Thermal Physics, Atomic and Molecular spectroscopy, Numerical Analysis, Digital Electronics, Nuclear and Particle Physics, Electronic devices. Apart from it program electives and open electives are also offered to the students for inculcating the interdisciplinary skills among the students. Few management courses like leadership and Entrepreneurship alongwith foreign language and effective communication courses are also being taught to the students to establish themselves in today's competitive world after completion of this program. Students are encouraged to participate in the extracurricular activities for their overall personality development.

The major attributes of this program are:

- Undergraduate Research
- Industry visit
- Visit to National research laboratories
- Expert talks from eminent speakers from India and abroad
- Interaction with Bhatnagar awardee and Padam shree awardee Physicists
- Workshops
- Tinkering Lab

## **Learning Outcomes**

- Ability to understand the established concepts and theory in basic and applied aspects of Physics.
- Understanding of phenomenon's in optics, electronics and materials science.
- Brain storming sessions on conceptual and numerical problems will lead to success in competitive examinations.
- Proficiency in writing technical, research reports and dissertation.
- Strength to work on small research projects.
- Ability to develop an innovative idea which is essential for a successful for an entrepreneurial venture.

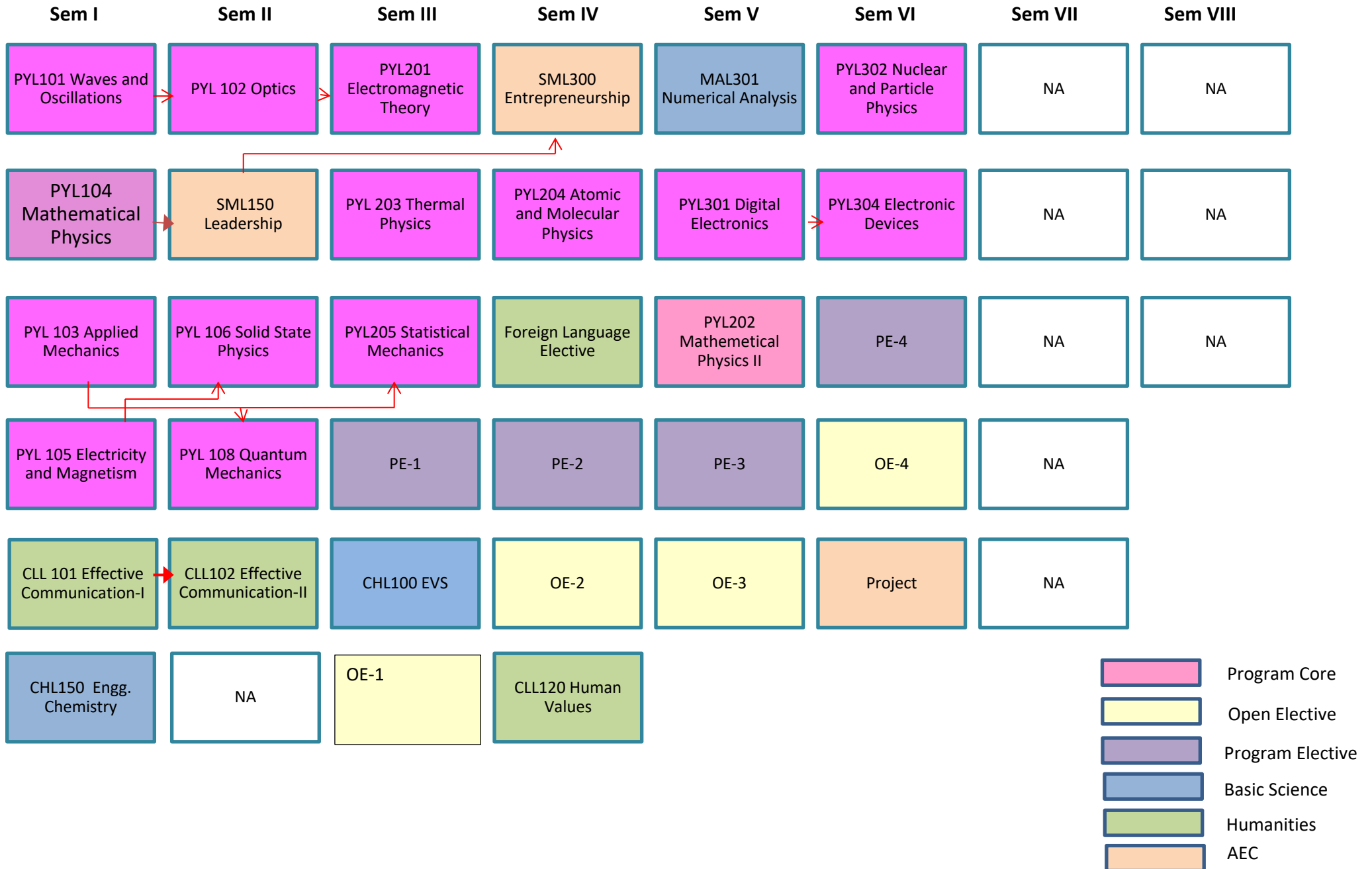
## **Career Options**

A strong base in Physics will help students to pursue research and jobs in interdisciplinary areas like:

- Biophysics
- Medical-Physics
- Geophysics
- Environmental Sciences
- Forensic Sciences and Statistics
- Science Journalism

Students who wish to opt out of Physics take up various competitive examinations including MBA, MCA and Civil Services.

# Flowchart of Prerequisites

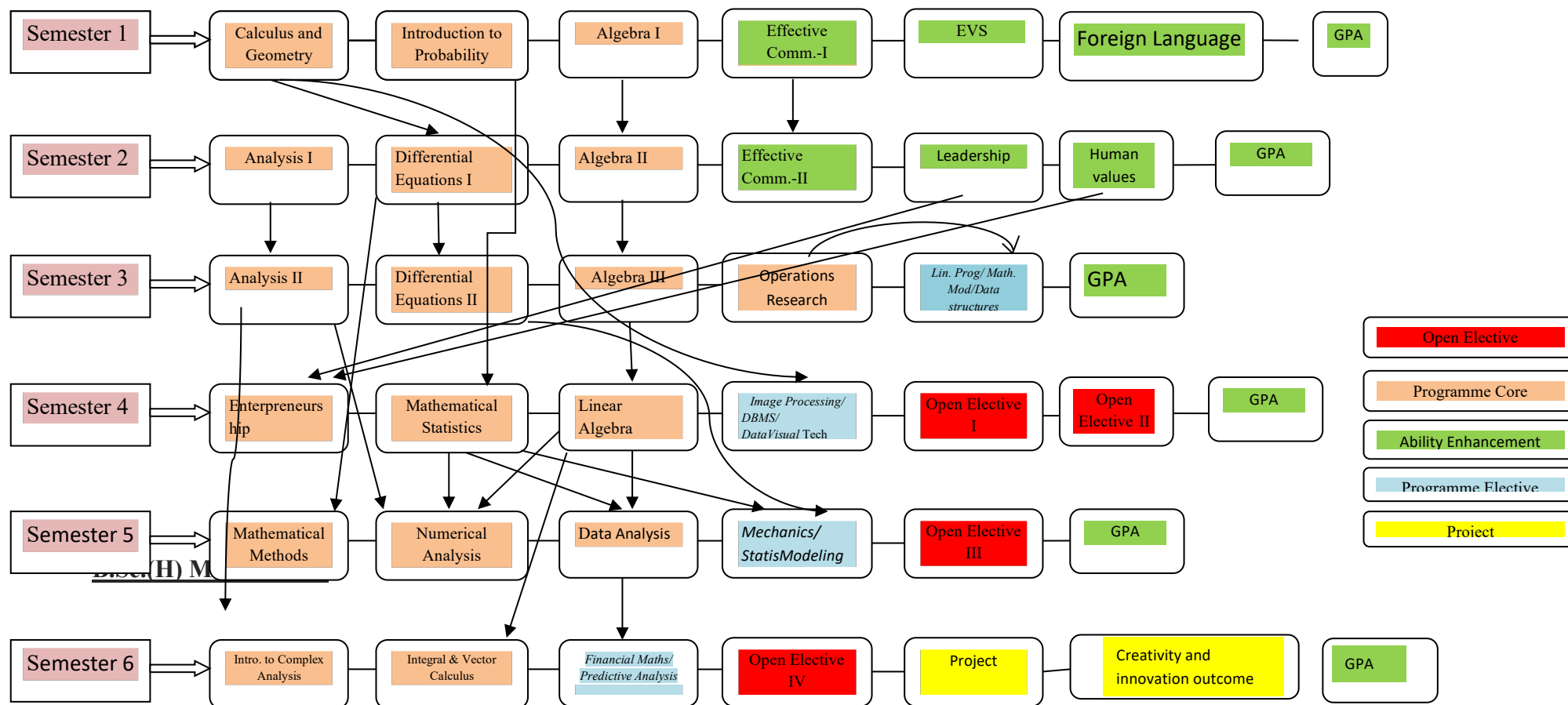


**SCHEME B.Sc. (HONS) MATHS 2019-22**

Sem	Course 1	Course 2	Course 3	Course 4	Course 5	Course 6	GP	Conthrs	Credits
I	MAL 101 Calculus and Geometry 3-1-0(4)	MAL 103 Intro to Probability 3-1-0(4)	MAL 105 Algebra I 3-1-0(4)	CLL 101 Effective Comm.-I 1-0-2(2)	CHL100 EVS 3-0-0(3)	Foreign Language Elective (1-2-0)3	MAR 100 (1)	21	21
II	MAL 102 Analysis I 3-1-0(4)	MAL 104 Differential Equations I 3-1-0(4)	MAL 108 Algebra II 3-1-0(4)	SML 150 Leadership 2-1-0(3)	CLL 102 Effective Comm.- II 1-0-2(2)	CLL 120 Human Values (2-0-0)2	MAR 110 (1)	20	20
III	MAL 201 Analysis II 3-1-0(4)	MAL 203 Differential Equations II 3-1-0(4)	MAL 205 Algebra III (3-1-0)4	MAL 207 Operations Research (3-1-0)4	Prog. Elective I 3-0-2(4) ( <i>Lin. Prog/ Math. Modelling/ Data Struc.Algos</i> )		MAR 200 (1)	21	21
IV	SML300 Entrepreneursh ip 2-1-0(3)	MAL 206 Mathematica I Statistics 3-1-0(4)	MAL 308 Linear Algebra (3-1-0)4	Prog.Elective II 3-0-2(4) ( <i>Image Processing./ DBMS. / Data Visual.Tech.</i> )	Open Elective I 3(3)	Open Elective II 3(3)	MAR 210 (1)	22	22
V	MAL 321 Mathematical Methods 3-1-0(4)	MAL 310 Numerical Analysis 2-1-2(4)	MAL301 Data Analysis (3-0-2)4	Prog.Elective III (MOOC) 3-0-2(4) ( <i>Mechanics/ Statis. Modeling./ Number theory</i> )	Open Elective III 3(3)		MAR 300 (1)	19	20

VI	MAL 311 Intro. to Complex Analysis 3-1-0( 4)	MAL 313 Integral & Vector Calculus 3-1-0( 4)	Prog. Elective IV (MOOC) 3-0-2 (4) <i>(Financial Maths/ Metric Space./ Predictive Analytics</i>	Open Elective IV 3 (3)	<b>Project (0-0-6)3</b>	Creativity and innovation outcome <b>(1)</b> MAL 320	MAR 310 (1)	16	<b>20</b>
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**Course Flow Chart for B.Sc (H) Mathematics 2019-2022**



B.Sc. (Hons.) Mathematics is an undergraduate Mathematics degree program. Mathematics is the branch of structure, space, quantity, and change. B.Sc.(H) Mathematics course provides in-depth knowledge about trigonometry, geometry, calculus, vector calculus and numerous other theories in Mathematics or respective disciplines, for example, computer science or statistics additionally to study of the normal Bachelor of Science subjects such as Physics and Chemistry.

After successful completion of B.Sc. Math Honours degree program, various employment offers open in actuarial sciences, statistics, mathematical modelling, computer sciences, cryptography etc.

Such postgraduates are hired in capacities such as Accountant, Personal Banker, Computer Programmer, Demographer, Economist, Loan Officer, Mathematician, Researcher, Statistician, Technical Writer, Treasury Management Specialist etc. The initial salary for these positions in the government organizations varies from INR 10,000 to 30,000 per month and in the private sector the package after B.Sc.(H) Mathematics varies from INR 2,00,000 to 8,00,000 per annum.

### **Learning outcomes**

- To equip students with knowledge, abilities and insight in mathematics and related fields.
- To enable them to work as a mathematical professional.
- To equip students with the ability to translate and synthesize their Understanding towards nature, human and development.
- To develop the ability to utilize the mathematical problem solving methods



such as analysis, modeling, and programming and mathematical software applications in addressing the practical and heuristic issues.

- To enable students to recognize the need for and the ability to engage in life-long learning.

### **Career options**

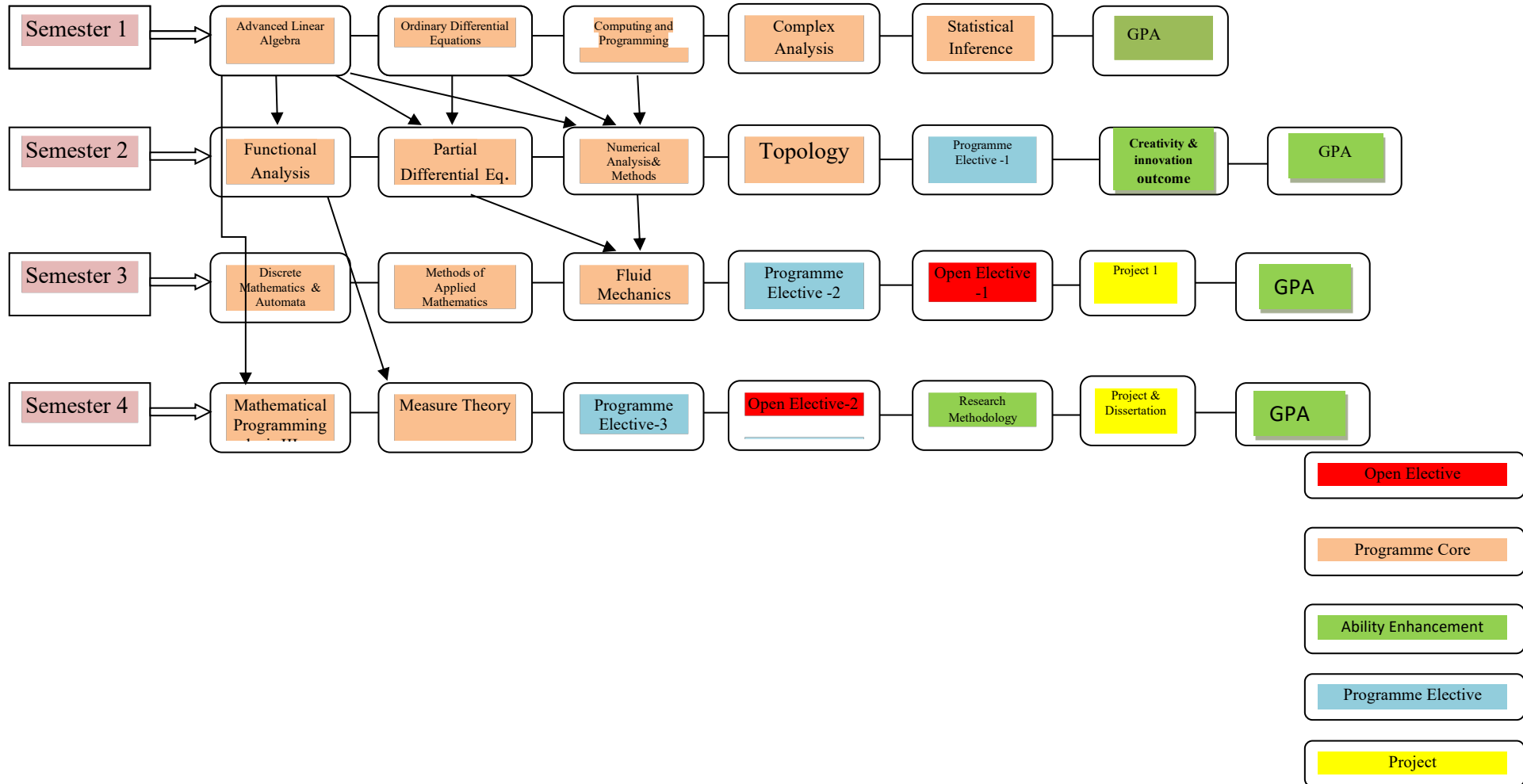
- Data Analyst
- Operational research
- Statistical research
- Banking-Investment
- Banking
- Banking-Retail
- Banking
- The Actuarial Profession
- Game Development
- Professional Services
- General Management
- Accountant,
- Personal Banker,

- Computer Programmer,
- Demographer,
- Economist,
- Loan Officer,
- Mathematician,
- Researcher,
- Statistician,
- Technical Writer,
- Treasury
- Management Specialist

**SCHEME OF M.Sc. MATHEMATICS 2019-2021**

Sem	Course Code - Course Name- L-T-P(C)						GPA	Contact Hours Per Week	
	Course 1	Course 2	Course 3	Course 4	Course 5				
I	MAL501 Advanced Linear Algebra 3-0-2(4)	MAL503 Ordinary Differential Equations 3-1-0(4)	MAL515 Computing and Programming 3-0-2(4)	MAL507 Complex Analysis 3-1-0(4)	MAL509 Statistical Inferences 3-0-2(4)		MA R 501  1	23	21
II	MAL502 Functional Analysis 3-1-0(4)	MAL504 Partial Differential Eq. 3-1-0(4)	MAL506 Numerical Analysis & Methods 3-0-2(4)	MAL508 Topology 3-1-0(4)	Programme Elective -1 3-0-2(4)	MAL 512 <b>Creativity and innovation outcome (1)</b>	MA R 502  1	22	22
III	MAL601 Discrete Mathematics & Automata Theory 3-1-0(4)	MAL 603 Methods of Applied Mathematics 3-1-0(4)	MAL 605 Fluid Mechanics 3-1-0(4)	Programme Elective -2 3-0-2(4) (MOOC)	Open Elective -1 3(3)	MAD 609 Project 1 0-0-4(2)	MA R 601  1	20	22
IV	MAL602 Mathematical Programming 3-1-0(4)	MAL614 Measure Theory 3-1-0(4)	Programme Elective-3 3-0-2 (4) (MOOC)	Open Elective-2 3 (3)	MAL 616 Research Methodology 2-1-0 (3)	MAD 610 Project & Dissertation 0-0-8(4)	MA R 602  1	19	23
Total								84	84

## Course Flow Chart for M.Sc Mathematics



## **Highlights of MSc in Mathematics**

Mathematics seeks to uncover universal mathematical structures underlying objects of investigation. The abstraction of concepts often performed in mathematical research attempts to extract the essential structure from individual objects of investigation, and whatever truths that are proven with this framework maintain their validity forever. MSc in Mathematics lies in understanding how different types of maths are categorized. Instead of focusing on a particular type of mathematics such as algebra or calculus, a postgraduate degree MSc in Mathematics allows students to concentrate on number theory and advanced mathematical methods that tie together all the different forms of mathematics they have likely already learned. One can learn abstract concepts used in modern mathematics, and develop the ability to grasp their underlying truths. It provides an opportunity to go beyond theoretical work in math and explore real-world applications, by understanding how math affects our lives. In addition to learning principles like statistical analysis, one can expect to expand their problem-solving and organizational skills that is important for future careers.

### **Learning outcomes of this track:**

- Student will be able to utilize statistical methods in the data driven decision making process
- Students will be able to work in different disciplines of science, engineering, or computing a solid core education
- Students will be able to get a feel to use their new skills in the real world which requires a research component
- Students will be able to use statistical methods to develop and maintain predictive models
- Students will be able to design the methodology suitable to the problem encountered
- Students will be able to give first-hand knowledge in advanced applied mathematics and forefront research experience
- Students will be able to seek out universal mathematical constructs to scientific discipline

### **Career Options:**

- Scientific Computing
- Teaching
- Data Scientist
- Data Analyst
- Banking – Retail

- The Actuarial Profession
- Game Development
- Statistical Researcher
- Higher Research -Phd
- Professional Service
- Database Manager
- External Auditor