M.Sc. (Physics) proposed structure, Model A

Total credits for 4 semesters = 80. Student can opt for more papers and get higher credit than 80
Marks allocated to a paper having 2 credits = 50
4 credits = 100
6 credits = 150

SEMESTER I: 20 credits, 26 hours

No. of Credits	SUBJECT	Contact Hours per week Theory + Tutorial + Lab
4	Classical Mechanics	3+1+0
4	Quantum Mechanics I	3+1+0
4	Electronics	3+1+0
2	Mathematical Physics	1+1+0
4	General Lab	0+0+8
2	Computer Lab	0+0+4

SEMESTER II: 20 credits, 26 hours

No. of Credits	SUBJECT	Contact Hours per week Theory + Tutorial + Lab
4	Quantum Mechanics II	3+1+0
4	Electromagnetic Theory	3+1+0
4	Statistical Mechanics	3+1+0
2	Mathematical Physics	1+1+0
4	General Lab	0+0+8
2	Computer Lab	0+0+4

SEMESTER III - 20 credits, 20-24 hours

No. of Credits	SUBJECT	Contact Hours per week Theory + Tutorial + Lab
4	Solid State Physics	3+1+0
4	Nuclear and Particle Physics	3+1+0
4+4+4	3 optional papers	3+1+0 or 0+0+8 or other

SEMESTER IV - 20 credits, 20-28 hours

No. of Credits	SUBJECT	Contact Hours per week Theory + Tutorial + Lab
4	Atomic and Molecular Physics	3+1+0
12 + 4 OR 4+4+4+4 OR 6+6+4	1 Exptal Module of 12 credits [(0+0+16) +(3+1+0)] and 1 other Optional paper [(3+1+0) or other] OR 4 Optional papers [each (3+1+0) or other] OR 3 Optional papers [2 papers of (5+1+0) and one of (3+1+0) or other]	Remark: The 16 hour lab is equivalent to two papers of 100 marks each.

Optional papers for Semester III (each 4 credits and 100 marks)

In Semester III a student may take any three papers from the papers listed below subject to the restriction that at most one paper each from the Applied Physics papers and Interdisciplinary papers is allowed. The Dissertation will count as one paper.

Advanced Theory papers:

1. T1: Advanced Classical Dynamics (3+1+0)
2. T2: Advanced Quantum Dynamics (3+1+0)
3. T2: Advanced Mathematical Physics (3+1+0)

Experimental papers:

1. E1: Methods in Experimental Physics & Instrumentation (3+1+0)
2. E2: Advanced Physics Lab (0+0+8)

Applied Physics Papers: These will have both theory and hands-on components. The number and titles of the courses are to be decided. A student of M.Sc. Physics can take at most one Applied Physics paper in Semester III.

1. A1: Radiation Safety
2. A2, A3, etc.: To be decided

Interdisciplinary papers: These will be open to students from other departments as well as M.Sc. Physics students and will offered in a common time slot agreed with other departments. A student of M.Sc. Physics can take at most one Interdisciplinary paper in Semester III.

3. I1: Introductory Astronomy (3+1+0)
4. I2: Biological Physics (3+1+0)
5. I3: A paper from any other Department of the University with at least 4 credits (equivalent to 4 contact hours of lectures + tutorial)

Dissertation: On a topic to be specified by individual faculty. To be examined at the end of the semester by a Board to be constituted by the Committee of Courses. Open only to students getting first division in Semesters I and II taken together.

Optional papers for Semester IV

A student can opt for EITHER one Experimental Module (12 credits) and one other paper (at least 4 credits) OR three or four papers adding up to at least 16 credits from the list of Special Theory papers, Other Laboratory plus Theory Options, Applied Physics papers, Interdisciplinary papers, Physics Education paper, and Dissertation, subject to the restriction that at most one paper each from the Applied Physics papers and Interdisciplinary papers is allowed. The Dissertation will count as one paper.

Special Theory papers (6 credits; contact hrs 5+1+0 or 4+2+0 to be decided).

1. General Theory of Relativity and Cosmology
2. Astrophysics
3. Advanced Solid State Physics

4. Plasma Physics
5. Particle Physics
6. Quantum Field Theory

Special Theory papers (4 credits; contact hrs 3+1+0).

7. String Theory
8. Nonlinear Dynamics
9. Superconductivity, Superfluidity and Critical Phenomena
10. Advanced Statistical Mechanics
11. Soft Matter Physics
12. Fluid Dynamics
13. Group Theory

Pre-requisites to be specified. Allowed combinations of papers to be specified.

Experimental Modules (Model A): Each module has 12 credits and consists of one Lab (8 credits, 16 hrs) and one associated theory paper (4 credits, 3+1+0). A student can take any one module out of the following:

1. Solid State Physics Lab + Solid State Physics Theory
2. Electronics Lab + Electronics Theory
3. Nanoscience Lab + Nanoscience Theory
4. Laser Spectroscopy Lab + Laser Spectroscopy Theory
5. Nuclear Physics Lab + Nuclear Physics Theory

Other Laboratory plus Theory Options: Each has one lab of 4 credits (0+0+8) and one theory paper of 4 credits (3+1+0)

1. Observational Astronomy Lab + Theory
2. Advanced Numerical Techniques Lab + Theory

Applied Physics papers: These will have both theory and hands-on components. The number and titles of the courses are to be decided. A student of M.Sc. Physics can take at most one Applied Physics paper in Semester IV.

1. A4, A5, etc.: To be decided

Interdisciplinary papers (4 credits): These will be open to students from other departments as well as M.Sc. Physics students and will offered in a common time slot agreed with other departments. A student of M.Sc. Physics can take at most one Interdisciplinary paper in Semester IV.

1. I4: Complex Systems and Networks (3+1+0)
2. I5: A paper from any other Department of the University with at least 4 credits (equivalent to 4 contact hours of lectures + tutorial)

Physics Education paper (4 credits; 2+1+2 or 2+0+4)

Dissertation (4 credits): On a topic to be specified by individual faculty. To be examined at the end of the semester by a Board to be constituted by the Committee of Courses. Open only to students getting first class in Semester I/II.

Mode of Examination: Labs – continuous evaluation. Theory Papers - 70% Final exam + 30% int. assessment.
Criterion for promotion from M.Sc. Previous to Final year: To be decided. (Suggestion: Clear courses adding up to at least 20 credits)
Criterion for passing M.Sc.: To be decided. (Suggestion: Clear courses adding upto at least 76 credits plus aggregate percentage at least 40% in Theory and Practical separately).

M.Sc (Physics) draft STRUCTURE Model B

Total credits for 4 semesters = 80. Student can opt for more papers and get higher credit than 80
Marks allocated to a paper having 2 credits = 50
4 credits = 100
6 credits = 150

SEMESTER I: 20 credits, 26 hours

No. of Credits	SUBJECT	Contact Hours Theory + Tutorial + Lab
4	Classical Mechanics	3+1+0
4	Quantum Mechanics I	3+1+0
4	Electronics	3+1+0
2	Mathematical Physics	1+1+0
4	General Lab	0+0+8
2	Computer Lab	0+0+4

SEMESTER II: 20 credits, 26 hours

No. of Credits	SUBJECT	Contact Hours Theory + Tutorial + Lab
4	Quantum Mechanics II	3+1+0
4	Electromagnetic Theory	3+1+0
4	Statistical Mechanics	3+1+0
2	Mathematical Physics	1+1+0
4	General Lab	0+0+8
2	Computer Lab	0+0+4

SEMESTER III - 20 credits, 20-24 hours

No. of Credits	SUBJECT	Contact Hours Theory + Tutorial + Lab
4	Solid State Physics	3+1+0
4	Nuclear and Particle Physics	3+1+0
4+4+4	3 optional papers	3+1+0 or 0+0+8 or other

SEMESTER IV - 20 credits, 20-28 hours

No. of Credits	SUBJECT	Contact Hours Theory + Tutorial + Lab
4	Atomic and Molecular Physics	3+1+0
8 + 4 + 4 OR 4+4+4+4 OR 6+6+4	1 Exptal Module of 8 credits [(0+0+8) +(3+1+0)] and 2 other Optional papers [(3+1+0) or other] OR 4 Optional papers [each (3+1+0) or other] OR 3 Optional papers [2 papers of (5+1+0) and one of (3+1+0) or other]	Remark: The 8 hour lab is equivalent to one paper of 100 marks.

Optional papers for Semester III (each 4 credits and 100 marks)

In Semester III a student may take any three papers from the papers listed below subject to the restriction that at most one paper each from the Applied Physics papers and Interdisciplinary papers is allowed, and if an Experimental Module is chosen, both the Lab and the Theory paper in the Module have to be taken together. The Dissertation will count as one paper.

Advanced Theory papers:

4. T1: Advanced Classical Dynamics (3+1+0)
5. T2: Advanced Quantum Dynamics (3+1+0)
6. T2: Advanced Mathematical Physics (3+1+0)

Experimental Modules: (Remark: This is the same as the presently existing structure of experimental papers in MSc Final.) Each module has 8 credits and consists of one Lab (4 credits, 8 hrs) and one associated theory paper (4 credits, 3+1+0). A student can take any one module out of the following:

1. Solid State Physics Lab I + Solid State Physics Theory I
2. Electronics Lab I + Electronics Theory I
3. Nanoscience Lab I+ Nanoscience Theory I
4. Laser Spectroscopy Lab I + Laser Spectroscopy Theory I
5. Nuclear Physics Lab I + Nuclear Physics Theory I

Applied Physics Papers: These will have both theory and hands-on components. The number and titles of the courses are to be decided. A student of M.Sc. Physics can take at most one Applied Physics paper in Semester III.

6. A1: Radiation Safety
7. A2, A3, etc.: To be decided

Interdisciplinary papers: These will be open to students from other departments as well as M.Sc. Physics students and will offered in a common time slot agreed with other departments. A student of M.Sc. Physics can take at most one Interdisciplinary paper in Semester III.

8. I1: Introductory Astronomy (3+1+0)
9. I2: Biological Physics (3+1+0)
10. I3: A paper from any other Department of the University with at least 4 credits (equivalent to 4 contact hours of lectures + tutorial)

Dissertation: On a topic to be specified by individual faculty. To be examined at the end of the semester by a Board to be constituted by the Committee of Courses. Open only to students getting first division in Semesters I and II taken together.

Optional papers for Semester IV

A student can opt for EITHER one Experimental Module (8 credits) and two other papers (adding up to at least 8 credits) OR three or four papers adding up to at least 16 credits from the list of Special Theory papers, Other Laboratory plus Theory Options, Applied Physics papers, Interdisciplinary papers, Physics Education paper, and Dissertation, subject to the restriction that at most one paper each from the Applied Physics papers and Interdisciplinary papers is allowed. The Dissertation will count as one paper.

Special Theory papers (6 credits; contact hrs 5+1+0 or 4+2+0 to be decided).

14. General Theory of Relativity and Cosmology
15. Astrophysics
16. Advanced Solid State Physics
17. Plasma Physics
18. Particle Physics
19. Quantum Field Theory

Special Theory papers (4 credits; contact hrs 3+1+0).

20. String Theory
21. Nonlinear Dynamics
22. Superconductivity, Superfluidity and Critical Phenomena
23. Advanced Statistical Mechanics
24. Soft Matter Physics
25. Fluid Dynamics
26. Group Theory

Pre-requisites to be specified. Allowed combinations of papers to be specified.

Experimental Modules: (Remark: This is the same as the presently existing structure of experimental papers in MSc Final.) Each module has 8 credits and consists of one Lab (4 credits, 8 hrs) and one associated theory paper (4 credits, 3+1+0). A student can take any one module out of the following:

6. Solid State Physics Lab II + Solid State Physics Theory II
7. Electronics Lab II + Electronics Theory II
8. Nanoscience Lab II+ Nanoscience Theory II
9. Laser Spectroscopy Lab II + Laser Spectroscopy Theory II
10. Nuclear Physics Lab II + Nuclear Physics Theory II

Other Laboratory plus theory options: Each has one lab of 4 credits (0+0+8) and one theory paper of 4 credits (3+1+0)

11. Observational Astronomy Lab + Theory
12. Advanced Numerical Techniques Lab + Theory

Applied Physics papers: These will have both theory and hands-on components. The number and titles of the courses are to be decided. A student of M.Sc. Physics can take at most one Applied Physics paper in Semester IV.

2. A4, A5, etc.: To be decided

Interdisciplinary papers (4 credits): These will be open to students from other departments as well as M.Sc. Physics students and will offered in a common time slot agreed with other departments. A student of M.Sc. Physics can take at most one Interdisciplinary paper in Semester IV.

3. I4: Complex Systems and Networks (3+1+0)
4. I5: A paper from any other Department of the University with at least 4 credits (equivalent to 4 contact hours of lectures + tutorial)

Physics Education paper (4 credits; 2+1+2 or 2+0+4)

Dissertation (4 credits): On a topic to be specified by individual faculty. To be examined at the end of the semester by a Board to be constituted by the Committee of Courses. Open only to students getting first class in Semester I/II.

Mode of Examination: Labs – continuous evaluation. Theory Papers - 70% Final exam + 30% int. assessment.
Criterion for promotion from M.Sc. Previous to Final year: To be decided. (Suggestion: Clear courses adding up to at least 20 credits)
Criterion for passing M.Sc.: To be decided. (Suggestion: Clear courses adding upto at least 76 credits plus aggregate percentage at least 40% in Theory and Practical separately).

M.Sc (Physics) draft STRUCTURE Model C

Model C is the same as Models A and B in the first year of M.Sc. (Sem I and II).

In Semester III instead of two core courses it has three core courses (including Atomic and Molecular Physics which appears in Semester IV in Models A and B).

An advantage of Model C mentioned in the meeting on 23/02/2018 is that the Laser Lab + Theory requires material from the Atomic and Molecular Physics course; hence it is better to have the latter course before the Laser Lab + Theory.

A disadvantage of Model C mentioned was that with 3 core (and hence compulsory) courses, Semester III has only two optional papers left for students.