

UM-DAE Center for Excellence in Basic Sciences

Outline of course structure for the M.Sc (Integrated) Physics stream

FIRST YEAR

(P: Physics, M: Mathematics, C: Chemistry, B: Biology, G: General, O: Out of Stream)

SEMESTER –I

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
M 101	Mathematics I	[2 +1]	3
P101	Mechanics & Waves	[2 +1]	3
C 101	Chemical Structures & Bonding	[2 +1]	3
B 101	General Biology	[2 +1]	3
G 101	Computer Basics	[2 +1]	3
H 101	Communication Skills	[2 +0]	1
		Contact hrs/per week Lab	Credits
PL101	Physics Laboratory	[3]	2
CL 101	Chemistry Laboratory	[3]	2
BL 101	Biology Laboratory	[3]	2
ML 101	Computer Laboratory	[3]	2

SEMESTER –II

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
M 201	Mathematics II	[2 +1]	3
P 201	Electricity & Magnetism	[2 +1]	3
C 201	Thermodynamics & Properties of Matter	[2 +1]	3
B 201	Molecular Biology	[2 +1]	3
G 201	Electronics & Instrumentation	[2 +1]	3
H 201	History of Science	[2 +0]	1
		Contact hrs/per week Lab	Credits
PL201	Physics Laboratory	[3]	2
CL 201	Chemistry Laboratory	[3]	2
BL 201	Biology Laboratory	[3]	2
GL 201	Electronics Laboratory	[3]	2

SECOND YEAR

SEMESTER –III

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
M 301	Mathematical Methods	[3 +1]	4
P 301	Quantum Theory I	[3 +1]	4
P 302	Kinetic Theory & Introductory Statistical Mechanics	[3 +1]	4
G 301	Statistical Techniques & Applications	[2 +1]	3
H 301	World Literature	[2 +0]	1
		Contact hrs/per week Lab	Credits
PL 301	Physics Laboratory	6	6
GL 301	Applied Electronics Laboratory	3	3

SEMESTER –IV

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
M 401	Mathematical Physics I	[3 +1]	4
P 401	Atoms, Molecules & Radiation	[3 +1]	4
O 401	Chemical Kinetics & Reaction Dynamics	[3 +1]	4
G 401	Environmental Science	[2 +1]	3
H 401	History of Indian Mathematics & Astronomy	[2 +0]	1
		Contact hrs/per week Lab	Credits
PL 401	Physics Laboratory	6	6
GL 401	Environmental Science Laboratory	3	3

THIRD YEAR

SEMESTER –V

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
P 501	Optics	[3 +1]	4
P 502	Classical Mechanics	[3 +1]	4
P 503	Electromagnetism & Special Relativity	[3 +1]	4
O 501	Numerical Methods	[3 +1]	4
G 501	Earth Sciences	[2 +1]	3
		Contact hrs/per week Lab	Credits
PL 501	Physics Laboratory	6	6

SEMESTER –VI

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
M 601	Mathematical Physics II	[3 +1]	4
P 601	Fluid Mechanics	[3 +1]	4
P 602	Quantum Theory II	[3 +1]	4
P 603	Statistical Mechanics	[3 +1]	4
G 601	Energy	[2 +1]	3
		Contact hrs/per week Lab	Credits
PL 601	Physics Laboratory	6	6

FOURTH YEAR

SEMESTER –VII

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
P 701	Classical Electrodynamics	[3 +1]	4
P 702	Solids & Semiconductors	[3 +1]	4
P 703	Nuclear & Particle Physics	[3 +1]	4
G 701	Biological Physics	[2 +1]	3
E 700	Elective I	4	4
		Contact hrs/per week Lab	Credits
OL 701	Physics Laboratory	3	3
PR 700	Project	-	6

SEMESTER –VIII

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
P 801	Physics of Materials	[3 +1]	4
P 802	Relativistic Quantum Mechanics & Elementary Quantum Field Theory	[3 +1]	4
P 803	Magnetohydrodynamics & Plasma Physics	[3 +1]	4
O 801	Radiation Physics	[3 +1]	4
E 800	Elective II	4	4
		Contact hrs/per week Lab	Credits
OL 801	Radiation Laboratory	3	3
PR 800	Project	-	6

FIFTH YEAR

SEMESTER –IX

Subject Code	Subject	Contact hrs/per week Theory + Tutorials	Credits
P 901	Lasers & Quantum Optics	[3 +1]	4
P 902	Accelerator Physics	[3 +1]	4
P 903	Techniques of Modern Physics	[3 +1]	4
G 904	Astronomy & Astrophysics	[3 +1]	4
E 900	Elective III	4	4
		Contact hrs/per week Lab	Credits
PL 901	Physics Laboratory	3	3
PR 900	Project	-	6

SEMESTER –X

Subject Code	Subject	Contact hrs/per week Lab	Credits
PR 1000	Project	-	9

ELECTIVES:

- E 1 Nano Sciences
- E 2 Relativity & Cosmology
- E 3 Semiconductor Devices
- E 4 Ultrafast Phenomena in Natural Sciences
- E 5 Advanced Nuclear Physics
- E 6 Differential Geometry & Applications to Physics
- E 7 Phase transitions & Critical Phenomena
- E 8 Advanced Electronics
- E 9 Nonlinear Dynamics & Chaos Theory
- E10 Photonics
- E11 Strong Field Science
- E12 Particle Physics
- E13 Classical & Quantum Information Theory
- E14 High Pressure Physics
- E 15 Advanced Quantum Field Theory
- E 16 Advanced Reactor Physics