

FIVE-YEAR INTEGRATED MASTER OF SCIENCE

PHYSICS

5-yr Integr. M.Sc. – Physics

CURRICULUM

for 2015 admissions onwards

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5-yr Integrated M.Sc Physics

2015 admissions onwards

GENERAL INFORMATION

Code Numbering:

Each course is assigned an 8-character Code number. The first two digits indicate the year of curriculum revision. The next three letters indicate the Department offering the course. The last three digits are unique to the course – the first digit indicates the level of the course (100, 200, 300, 400 etc.); the second digit indicates the type of the course, viz. 0, 1 and 2 indicate the core courses; 3,4,5,6 and 7 indicate the Elective courses; 8 indicates the Lab. or practical-based courses and 9 indicates Projects.

ABBREVIATIONS USED IN THE CURRICULUM:

Cat.	-	Category
Cr	-	Credits
ES	-	Exam Slot
L	-	Lecture
P	-	Practicals
T	-	Tutorial

DISCIPLINES

AVP	-	Amrita Values Programmes
BUS	-	Business Management
CHY	-	Chemistry
CMJ	-	Communication and Journalism
COM	-	Commerce
CSA	-	Computer Science and Applications
CSN	-	Computer Systems and Network
CUL	-	Cultural Education
ECO	-	Economics
ELL	-	English Language and Literature
ENG	-	English
ENV	-	Environmental Sciences
FNA	-	Fine Arts
HIN	-	Hindi
KAN	-	Kannada
LAW	-	Law
MAL	-	Malayalam
MAT	-	Mathematics
MCJ	-	Mass Communication and Journalism
OEL	-	Open Elective
PHY	-	Physics
SAN	-	Sanskrit
SSK	-	Soft Skills
SWK	-	Social Work
TAM	-	Tamil

SEMESTER I

Course Code	Course Title	L-T-P	Cr	ES
15ENG101	Communicative English	2 0 2	3	A
	Language Paper I	1 0 2	2	B
15PHY101	Mechanics and Properties of Matter	3 1 0	4	E
15CHY102	Chemistry I	3 0 0	3	C
15CSA100	Problem Solving and Computer Programming	3 0 0	3	D
15MAT106	Trigonometry and Differential Equations	3 1 0	4	G
15CHY182	Chemistry Lab.	0 0 2	1	L2
15CSA180	Problem Solving and Computer Programming Lab.	0 0 2	1	L1
15CUL101	Cultural Education I	2 0 0	2	F
TOTAL				23

SEMESTER II

Course Code	Course Title	L-T-P	Cr	ES
15ENG121	Professional Communication	1 0 2	2	A
	Language Paper II	1 0 2	2	B
15PHY111	Basics of Electricity and Magnetism	3 1 0	4	E
15CHY112	Chemistry II	3 0 0	3	C
15CSA116	Advanced Computer Programming	3 0 0	3	D
15MAT116	Matrices and Vector Calculus	3 1 0	4	G
15CHY185	Chemistry Lab. - Instrumental	0 0 2	1	L2
15CSA187	Advanced Computer Programming Lab.	0 0 2	1	L1
15PHY182	Physics Lab. - Mechanics and Properties of Matter	0 0 2	1	L3
15CUL111	Cultural Education II	2 0 0	2	F
TOTAL				23

SEMESTER III

Course Code	Course Title	L-T-P	Cr	ES
15PHY201	Basic Experimental Techniques in Physics	3 1 0	4	C
15PHY202	Optics and Wave Motion	3 1 0	4	A
15CHY203	Electrochemistry	3 1 0	4	B
15ENV300	Environmental Science and Sustainability	3 0 0	3	D
15MAT226	Fourier Analysis, Laplace Transform and Partial Differential Equations	3 1 0	4	E
15PHY281	Physics Lab. - Electricity and Magnetism	0 0 2	1	L1
15SSK201	Life Skills I	1 0 2	2	G
15AVP201	Amrita Values Programme I	1 0 0	1	F
TOTAL				23

SEMESTER IV

Course Code	Course Title	L-T-P	Cr	ES
15PHY211	Analog Electronics	3 1 0	4	A
15PHY213	Thermal Physics	3 1 0	4	C
15CHY214	Chemistry of Materials	3 1 0	4	D
15MAT237	Mathematical Statistics and Numerical Methods	3 1 0	4	E
15PHY285	Physics Lab. - Optics	0 0 2	1	L1
	Open Elective A*	3 0 0	3	J
15SSK211	Life Skills II	1 0 2	2	G
15AVP211	Amrita Values Programme II	1 0 0	1	F
TOTAL				23

SEMESTER V

Course Code	Course Title	L-T-P	Cr	ES
15PHY301	Digital Electronics	3 1 0	4	A
15PHY302	Electrodynamics	3 1 0	4	B
15PHY303	Solid State Physics	3 1 0	4	C
15PHY304	Modern Physics	3 1 0	4	D
	Elective A	3 0 0	3	E
15PHY381	Physics Lab. – Electronics	0 0 2	1	L1
15SSK301	Life Skills III	1 0 2	2	G
15PHY390	Live-in-Lab. [@] / Open Elective B*	3 0 0	3	J
TOTAL			25	

SEMESTER VI

Course Code	Course Title	L-T-P	Cr	ES
15PHY311	Atomic and Molecular Physics	3 1 0	4	A
15PHY312	Intermediate Mechanics	3 1 0	4	B
15PHY313	Modern Optics	3 1 0	4	C
	Elective B	3 0 0	3	E
15PHY385	Physics Lab. – Modern Physics	0 0 2	1	L1
TOTAL			16	
15PHY399	Project (for Exit-option students)		6	P
TOTAL			22	

TOTAL (for Exit-option students) = 139

SEMESTER VII

Course Code	Course Title	L-T-P	Cr	ES
15PHY501	Classical Mechanics	3 1 0	4	A
15PHY503	Mathematical Physics I	3 1 0	4	B
15PHY504	Quantum Mechanics I	3 1 0	4	C
15PHY506	Computational Physics	3 1 0	4	D
15PHY581	Physics Lab. A	0 0 6	2	L1
15PHY582	Simulation Lab.	0 0 3	1	L2
15PHY595	Seminar	0 0 3	1	P1
TOTAL			20	

SEMESTER VIII

Course Code	Course Title	L-T-P	Cr	ES
15PHY511	Quantum Mechanics II	3 1 0	4	A
15PHY512	Mathematical Physics II	3 1 0	4	B
15PHY513	Statistical Mechanics	3 1 0	4	C
15PHY514	Advanced Electrodynamics	3 1 0	4	D
15PHY515/ 15PHY516	Experimental Techniques/ Advanced Experimental Techniques	3 1 0	4	E
15PHY585	Physics Lab. B	0 0 6	2	L1
TOTAL			22	

SEMESTER IX

Course Code	Course Title	L-T-P	Cr	ES
15PHY602	Condensed Matter Physics	3 1 0	4	A
15PHY603	Nuclear and Particle Physics	3 1 0	4	B
15PHY604/ 15PHY605	Advanced Electronics / Spectroscopy	3 1 0	4	C
	Elective I	3 0 0	3	D
	Elective II	3 0 0	3	E
15PHY682 / 15PHY586	Advanced Electronics Lab, / Spectroscopy Lab.	0 0 6	2	L1
TOTAL			20	

SEMESTER X

Course Code	Course Title	L-T-P	Cr	ES
15PHY696	Project		10	P
TOTAL			10	

TOTAL = 205**ELECTIVES**

Course Code	Course Title	L-T-P	Cr	ES
ELECTIVES - A and B (any three)				
15PHY248	Physics of Lasers and Applications	3 0 0	3	D/E
15PHY331	Astronomy	3 0 0	3	D/E
15PHY332	Computational Methods for Physicists	3 0 0	3	D/E
15PHY333	Concepts of Nanophysics and Nanotechnology	3 0 0	3	D/E
15PHY334	Introduction to Photonics	3 0 0	3	D/E
15PHY335	Medical Physics	3 0 0	3	D/E
15PHY336	Nonlinear Optics	3 0 0	3	D/E
15PHY337	Optical Engineering	3 0 0	3	D/E
15PHY338	Physics of Semiconductor Devices	3 0 0	3	D/E
15PHY340	Physics of Waves	3 0 0	3	D/E
ELECTIVES – I and II (any two)				
15PHY531	Antennas and Wave Propagation	3 0 0	3	D/E
15PHY533	Biophotonics	3 0 0	3	D/E
15PHY534	Biophysics	3 0 0	3	D/E
15PHY535	Earth's Atmosphere	3 0 0	3	D/E
15PHY536	Earth's Structure and Evolution	3 0 0	3	D/E
15PHY537	Fibre Optic Sensors and Applications	3 0 0	3	D/E
15PHY538	Fibre Optics and Technology	3 0 0	3	D/E
15PHY539	Nanophotonics	3 0 0	3	D/E
15PHY541	Nuclear Physics	3 0 0	3	D/E
15PHY543	Physics of Cold Atoms and Ions	3 0 0	3	D/E
15PHY544	Quantum Electrodynamics	3 0 0	3	D/E
15PHY545	Quantum Optics	3 0 0	3	D/E
15PHY546	Thin Film Technology	3 0 0	3	D/E
15PHY548	Fundamentals of Plasma Physics	3 0 0	3	D/E
15PHY549	Space Physics	3 0 0	3	D/E
15PHY557	Astrophysics and Cosmology	3 0 0	3	D/E
15PHY558	Nonlinear Dynamics and Chaos	3 0 0	3	D/E
15PHY559	Physics of Optoelectronic Devices	3 0 0	3	D/E

LANGUAGE - Paper I

Course Code	Course Title	L-T-P	Cr	ES
15HIN101	Hindi I	1 0 2	2	B
15KAN101	Kannada I	1 0 2	2	B
15MAL101	Malayalam I	1 0 2	2	B
15SAN101	Sanskrit I	1 0 2	2	B
15TAM101	Tamil I	1 0 2	2	B

LANGUAGE - Paper II

Course Code	Course Title	L-T-P	Cr	ES
15HIN111	Hindi II	1 0 2	2	B
15KAN111	Kannada II	1 0 2	2	B
15MAL111	Malayalam II	1 0 2	2	B
15SAN111	Sanskrit II	1 0 2	2	B
15TAM111	Tamil II	1 0 2	2	B

* Two Open Elective courses are to be taken by each student, one each at the fourth and the fifth semesters, from the list of Open electives offered by the School.

© Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Open Elective course in the fifth semester.

OPEN ELECTIVES (3 0 0 3)

15OEL231	Advertising
15OEL232	Basic Statistics
15OEL233	Citizen Journalism
15OEL234	Creative Writing for Beginners
15OEL235	Desktop Support and Services
15OEL236	Development Journalism
15OEL237	Digital Photography
15OEL238	Emotional Intelligence
15OEL239	Essence of Spiritual Literature
15OEL240	Film Theory
15OEL241	Fundamentals of Network Administration
15OEL242	Gender Studies
15OEL243	Glimpses of Indian Economy and Polity

15OEL244	Graphics and Web-designing Tools
15OEL245	Green Marketing
15OEL246	Healthcare and Technology
15OEL247	History of English Literature
15OEL248	Indian Writing in English
15OEL249	Industrial Relations and Labour Welfare
15OEL250	Introduction to Ancient Indian Yogic and Vedic Wisdom
15OEL251	Introduction to Computer Hardware
15OEL252	Introduction to Event Management
15OEL253	Introduction to Media
15OEL254	Introduction to Right to Information Act
15OEL255	Introduction to Translation
15OEL256	Linguistic Abilities
15OEL257	Literary Criticism and Theory
15OEL258	Macro Economics
15OEL259	Managing Failure
15OEL260	Media Management
15OEL261	Micro Economics
15OEL262	Micro Finance, Small Group Management and Cooperatives
15OEL263	Negotiation and Counselling
15OEL264	New Literatures
15OEL265	Non-Profit Organisation
15OEL266	Personal Effectiveness
15OEL267	Perspectives in Astrophysics and Cosmology
15OEL268	Principles of Marketing
15OEL269	Principles of Public Relations
15OEL270	Science, Society and Culture
15OEL271	Statistical Analysis
15OEL272	Teamwork and Collaboration
15OEL273	The Message of Bhagwad Gita
15OEL274	Understanding Travel and Tourism
15OEL275	Videography
15OEL276	Vistas of English Literature
15OEL277	Web-Designing Techniques