

CENTRE FOR APPLIED PHYSICS (CAP)
CENTRAL UNIVERSITY OF JHARKHAND

COURSE STRUCTURE FOR Ph.D. IN CAP

S. No.	Course Code	Course Title	L	T	P	CR
1	PHDCAP 111010	Research Methodology(compulsory to all students)	4	0	0	4
2	PHDCAP 111020	Nanophotonics and applications	4	0	0	4
3	PHDCAP 111030	Fiber optics: communication and instrumentation	4	0	0	4
4	PHDCAP 111040	Numerical Methods	4	0	0	4
5	PHDCAP 111050	Synthesis Methodology	4	0	0	4
6	PHDCAP 111060	Characterization Techniques	4	0	0	4
7	PHDCAP 111070	Physics of Materials and Devices	4	0	0	4
8	PHDCAP 111080	Science and Technology of Low Dimensional Materials	4	0	0	4
9	PHDCAP 111090	Physics for Biology	4	0	0	4
10	PHDCAP 111100	Heavy Ion Collision Physics	4	0	0	4
11	PHDCAP 111110	Many body theory in Condensed Matter Physics	4	0	0	4
12	PHDCAP 111120	Nuclear Physics	4	0	0	4
13	PHDCAP 111130	Quantum Optics	4	0	0	4
14	PHDCAP 111140	Laser Physics and Nonlinear Optics	4	0	0	4
15	PHDCAP 111150	Quantum Information	4	0	0	4
16	PHDCAP 111160	Quantum Theory of Solids	4	0	0	4
17	PHDCAP 111170	Numerical Analysis	4	0	0	4
18	PHDCAP 111180	Green's function in Solid State Physics	4	0	0	4
19	PHDCAP 111190	Hubbard Model and its Applications	4	0	0	4
20	PHDCAP 111200	Radiation Physics	4	0	0	4
21	PHDCAP 111210	Quantum Field Theory	4	0	0	4
22	PHDCAP 111220	Renormalization theory and its application	4	0	0	4

CENTRE FOR APPLIED PHYSICS (CAP)
CENTRAL UNIVERSITY OF JHARKHAND
Five Years Integrated M.Sc. Programme in Applied Physics

L-Lecture, T-Tutorial, P-Practical (Lab), Cr-Credits.						
FIRST SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	MAT 110010	Mathematics-I	3	1	0	3
2	PHY/111021	a) General Properties of Matter (for core Physics)	4	0	0	4
	PHY/110021	b) Introductory Physics-I (Chemistry, Maths, Energy Engineering, Water Engineering , Nano Technology, LRM)	3	1	0	3
	PHY/110031	c) Basic Physics-I (for EVS and Life Sciences)	3	1	0	3
3	CHM 110030	Principles of Chemistry-I	3	0	0	3
4	PHY 111110	Waves and Oscillations (for Core Physics)	4	0	0	4
5	COM 110050	Fundamentals of Computer & C programming	3	1	0	3
6	PHY 110060	Environmental Studies	3	0	0	3
7	BIO 110070	Introductory Biology	3	0	0	3
8	PHY 112080	Applied Physics Lab-I	0	0	4	2
9	CHM 112090	Principles of Chemistry Lab-I	0	0	4	2
Total Credits 27 for core Physics students and 26 for students of Chemistry, Maths, Energy Engineering, Water Engineering, Management, Nano Technology, EVS and Life Sciences						

SECOND SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	MAT 120010	Mathematics-II	3	1	0	3
2	PHY 121100	a) Vector Calculus (for core Physics)	4	0	0	4
	PHY 120020	b) Introductory Physics-II (Chemistry, Maths, Energy Engineering, Water Engineering and Management, Nano Technology)	3	1	0	3
	PHY 120020b	c) Basic Physics-II (for EVS and Life Sciences)	3	1	0	3
3	CHM 120030	Principles of Chemistry-II	3	1	0	3
4	ENG 120040	Communicative English	3	0	2	4
5	PHY 121140	Heat	4	0	0	4
6	PHY 121060	Modern Physics	4	0	0	4
7	PHY 122110	Applied Physics Lab-II	0	0	4	2
8	CHM 122120	Principles of Chemistry Lab-II	0	0	4	2
Total Credits 26 for core Physics students and 25 for students of Chemistry, Maths, Energy Engineering, Water Engineering, Management, Nano Technology, EVS and Life sciences						

THIRD SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	LRM 210100	Disaster Management	3	0	0	3
2	PHY/THP/211020	Thermal Physics	4	0	0	4
3	PHY/OPT/211030	Optics	4	0	0	4
4	PHY/CLM/211070	Classical Mechanics-I	4	0	0	4
5	PHY/MTP/211080	Mathematical Physics-I	4	0	0	4
6	PHY/APL/212060	Applied Physics Lab-III	0	0	8	4
Total Credits						23

FOURTH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/MPH/221010	Mathematical Physics-II	4	0	0	4
2	PHY/QPH/221020	Quantum Physics	4	0	0	4
3	PHY/ELE/221030	Electronics-I	4	0	0	4
4	PHY/SSP/221040	Solid State Physics- I	4	0	0	4
5	PHY/ELM/221090	Electricity and Magnetism-I	4	0	0	4
6	PHY/APL/222050	Applied Physics Lab-IV	0	0	8	4
Total Credits						24

FIFTH SEMESTER (ANY FOUR FROM CAP + TWO FROM OTHER CENTRES)						
S. No.	Course Code	Course Title	L	T	P	CR
1		Elective-I	4	0	0	4
2		Elective-II	4	0	0	4
3		Elective-III	4	0	0	4
4		Elective-IV	4	0	0	4
5		Elective-V	4	0	0	4
6		Elective-VI	4	0	0	4
7		Elective-VII	4	0	0	4
Total Credits (16 FROM CAP + 08 FROM OTHER CENTRES)						24
SIXTH SEMESTER						
+S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/STM/321010	Statistical Mechanics-I	4	0	0	4
2	PHY/NUP/321030	Nuclear Physics	4	0	0	4
3	PHY/ELM/321040	Electricity and Magnetism-II	4	0	0	4
4	PHY/AMP/321050	Atomic and Molecular Physics-I	4	0	0	4
5	PHY/QPH/321020	Quantum Mechanics-I	4	0	0	4
6	PHY/APL/322050	Applied Physics Lab-VI	0	0	8	4
Total Credits						24
SEVENTH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/QTM/411010	Quantum Mechanics-II	4	0	0	4
2	PHY/CLM/411020	Classical Mechanics-II	4	0	0	4
3	PHY/CLE/411030	Classical Electrodynamics	4	0	0	4
4	PHY/ETA/411040	Experimental Techniques and Analytical Studies	4	0	0	4
5	PHY/SSP/411050	Solid State Physics-II	4	0	0	4
6	PHY/APL/412060	Applied Physics Lab-VII	0	0	8	4
Total Credits						24
EIGHTH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/STP/421010	Statistical Physics-II	4	0	0	4
2	PHY/ELE/421020	Electronics-II	4	0	0	4
3	PHY/CFT/421030	Classical Field Theory	4	0	0	4
4	PHY/AMP/421040	Atomic and Molecular Physics-II	4	0	0	4
5	PHY/MPH/421050	Advanced Mathematical Physics	4	0	0	4
6	PHY/APL/412060	Applied Physics Lab-VIII	0	0	8	4
Total Credits						24
NINETH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/AQM/511010	Advanced Quantum Mechanics	4	0	0	4
2	PHY/NPP/511020	Nuclear and Particle Physics	4	0	0	4
3		Special paper-I	4	0	0	4
4		Special paper-II	4	0	0	4
		Special paper-III	4	0	0	4
5	PHY/APL/512110	Applied Physics Lab-IX	0	0	8	4
Total Credits						24
TENTH SEMESTER						
S. No.	Course Code	Course Title				CR
1	PHY524010	Project work				24
Total Credits						24

SPECIAL PAPERS

S.No.	Course Code	Name of the Elective Courses
1.	PHY/ENP/515030	Experimental Nuclear Physics
2.	PHY/ACM/515040	Advanced Condensed Matter Theory
3.	PHY/STM/515050	Advanced Statistical Mechanics
4.	PHY/QFT/515060	Quantum Field Theory
5.	PHY/HEC/515070	High Energy Heavy Ion Collision Physics
6.	PHY/NAN/515080	Nanoscience
7.	PHY/PPL/515090	Plasma Physics and Lasers
8.	PHY/NPH/515100	Nano-Photonics

LIST OF ELECTIVES (ANY FOUR)

S.No.	Course Code	Name of the Elective Courses
1.	PHY/INP/315050	Intermediate Energy Nuclear Physics
2.	PHY/CQM/315060	Conceptual Development of Quantum Mechanics
3.	PHY/MBI/315070	Mathematical Biology
4.	PHY/FIO/315080	Fiber and Integrated Optics
5.	PHY/CEI/315020	Communication Electronics
6.	PHY/OFC/315030	Optoelectronics and Fiber Optic Communication
7.	PHY/TCP/315100	Tensor Calculus and Its Basic Application in Physics
8.	PHY/STR/315090	Special Theory of Relativity
9.	PHY/NST/315010	Nano Science and Nanotechnology
10.	PHY/ARP/315040	Applied Radiation Physics
11.	PHY/EXP/315110	Experimental Physics
12.	PHY/TFT/315120	Thin Film Technology

**Curriculum and Syllabus
for
2 Years Master of Science
in
Physics**



**Centre for Applied Physics
Central University of Jharkhand
2017**

Curriculum

Detailed course structure for 2-years (4 semesters) M. Sc. Course in Physics. The centre initially intends to offer specialization in following five sub-areas of Physics:

1. Applied Optics
2. Space Physics
3. Nuclear Physics
4. Condensed Matter Physics
5. High Energy Physics

FIRST SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/611010	Mathematical Physics	4	0	0	4
2	PHY/611020	Quantum Mechanics	4	0	0	4
3	PHY/611030	Solid State Physics	4	0	0	4
4	PHY/611040	Classical Physics and Relativity	4	0	0	4
5	PHY/611050	Fiber and Integrated Optics	4	0	0	4
6	PHY/611060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

SECOND SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/621010	Classical Electrodynamics	4	0	0	4
2	PHY/621020	Electronics	4	0	0	4
3	PHY/621030	Plasma and Space Physics	4	0	0	4
4	PHY/621040	Statistical Mechanics	4	0	0	4
5	PHY/621050	Atomic and Molecular Physics	4	0	0	4
6	PHY/621060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

THIRD SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/711010	Experimental Techniques in Physics	4	0	0	4
2	PHY/711020	Nuclear and Particle Physics	4	0	0	4
3	PHY/711030	Numerical Analysis & Programming	3	1	0	4
4	PHY/711040	Quantum Electronics	4	0	0	4
5	PHY/711050	Condensed Matter Physics	4	0	0	4
6	PHY/711060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

FOURTH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1		Special Paper I	4	0	0	4
2		Special Paper II	4	0	0	4
3		Project/Dissertation				12
Total Credits						20

*Special Papers (any two)

Sl No.	Field of Specialization	List of Papers
1.	Applied Optics	1. Nanophotonics

		2. Optoelectronics and Optical Computing
		3. Fourier Optics & Holography
2.	Space Physics	1. Magnetohydrodynamics
		2. Planetary Physics
		3. Solar Environment
3.	Nuclear Physics	1. Nuclear Physics: Interactions & Models
		2. Applied Radiation Physics
		3. Accelerator Physics
4.	Condensed Matter Physics	1. Condensed Matter Physics-I
		2. Condensed Matter Physics-II
		3. Condensed Matter Physics-III
5.	High Energy Physics	1. High Energy Physics I
		2. High Energy Physics II
		3. Quark Gluon Plasma & Quarkonium

*A student is required to select any two papers form their respective field of specialization.

Final draft of 2 Years M Sc course in Physics

Final draft of 2 Years M Sc course in Physics

Curriculum

Detailed course structure for 2-years (4 semesters) M. Sc. Course in Physics. The centre initially intends to offer specialization in following five sub-areas of Physics:

1. Applied Optics
2. Space Physics
3. Nuclear Physics
4. Condensed Matter Physics
5. High Energy Physics

FIRST SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/611010	Mathematical Physics	4	0	0	4
2	PHY/611020	Quantum Mechanics	4	0	0	4
3	PHY/611030	Solid State Physics	4	0	0	4
4	PHY/611040	Classical Physics and Relativity	4	0	0	4
5	PHY/611050	Fiber and Integrated Optics	4	0	0	4
6	PHY/612060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

SECOND SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/621010	Classical Electrodynamics	4	0	0	4
2	PHY/621020	Electronics	4	0	0	4
3	PHY/621030	Plasma and Space Physics	4	0	0	4
4	PHY/621040	Statistical Mechanics	4	0	0	4
5	PHY/621050	Atomic and Molecular Physics	4	0	0	4
6	PHY/622060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

THIRD SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1	PHY/711010	Experimental Techniques in Physics	4	0	0	4
2	PHY/711020	Nuclear and Particle Physics	4	0	0	4
3	PHY/711030	Numerical Analysis & Programming	3	1	0	4
4	PHY/711040	Quantum Electronics	4	0	0	4
5	PHY/711050	Condensed Matter Physics	4	0	0	4
6	PHY/712060	Applied Physics Laboratory	0	0	4	4
Total Credits						24

FOURTH SEMESTER						
S. No.	Course Code	Course Title	L	T	P	CR
1		Special Paper I	4	0	0	4
2		Special Paper II	4	0	0	4
3		Project/Dissertation				12
Total Credits						20