1.1.3 & 1.2.1

Supporting Documents- Department of Physical Sciences

Approved MOMs of BOS/ Academic Council Highlighting the Name of New Courses Introduced_1.2.1

Annexure 1.1.2 & 1.2.2
88 (P)

IK Gujral Punjab Technical University, Kapurthala
Department of Physical Sciences

Ref No.: IKGPTU/PS/981 Date: 12.4.18

Subject: Proceedings of the Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) meeting held on 27.03.2018.

A meeting of members of Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) was held on 27.03.2018 in the Department of Physical Sciences, I K Gujral Punjab Technical University, Kapurthala. The agenda of the meeting was discussed in detail and recommendations were made on point. The proceedings of the meetings were recorded in the minutes of the meeting as enclosed as an Annexure-A.

In the meeting, the syllabus of the Engineering Physics for B. Tech. 1st Year and M.Sc.(Physics) was approved for adoption from 2018-19 which is enclosed as an Annexure-B and Annexure-C.

Submitted for necessary action.

12/04/18
Convener- BoS
Dr. Hitesh Sharma

Convener- BoS
Dr. Neetika

12/4/18
Chairman, Board of Studies
Head, Physical Sciences.

Head
Department of Physical Sciences
I.K. Gujral Punjab Technical University
Main Campus

I.K. Gujral Punjab Technical University, Kapurthala

Department of Physical Sciences

Minutes of Meeting

A meeting of members of Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) was held on 27.03.2018 in the Department of Physical Sciences, I K Gujral Punjab Technical University, Kapurthala.

The following were present in the meeting:

1. Dr. Amit Sarin (Chairperson)
2. Dr. Ravi Kumar, Member
3. Dr Rakesh Dogra, Member
4. Dr. Arvind Kumar, Member
5. Dr. Ranjan Kumar, Member
6. Dr. Kanchan L. Singh, Member
7. Dr. Hitesh Sharma, Member
8. Dr. Maninder Kaur, Member
9. Dr. Y S Brar, Chairperson(EE) as Special invitee
10. Dr. Rajiv Chauhan, Chairperson (Civil Eng) as Special invitee
11. Dr. Vikas Chawla, Chairperson(ME) as Special invitee
12. Dr. A S Bhuttar, Chairperson(ECE) as Special invitee
13. Dr. Varinderjit Singh (Special invitee)
14. Dr. Neetika (Special invitee)
15. Ms.Jaskaranpreet M.Sc.(2nd Year)-Student representative
16. Mr.Nikhil M.Sc.(1st Year)-Student representative

The following members could not attend the meeting:

1. Dr. Davinder Mehta, Member
2. Dr. R. K. Bedi, Member
3. Dr. Harpreet Kaur Grewal, Member
4. Dr. B D Gupta, Member
5. Dr. Rajiv Malhotra, Member
6. Dr. P. Arumugam, Member
7. S. Navdeepak Sandhu, Member
8. Dr. Harkirat Singh, (Special invitee)
9. Dr. Monika Sachdeva , (Special invitee)

The Board of Studies discussed on all the agenda points and following recommendations were made:

Agenda item 1: To consider the revision of Engineering Physics course in B.Tech-1st Year (for all Engineering Branches) as per model syllabus of AICTE:

All BoS members discussed in detail the new model syllabi proposed for Engineering Physics by AICTE for adoption. All members agreed with the recommendations of AICTE which has proposed to offer branch specific Engineering Physics subjects to B.Tech-1st Year Students and decided to implement same in IKG Punjab Technical University. The Engineering branches for which AICTE has not proposed any theory and Lab subject, the new course subjects prepared by combining the different modules proposed by the AICTE, were approved. All engineering specializations which are being offered at present by the IKG Punjab Technical University have been categorized in seven (07) groups. Accordingly, seven (07) theory and seven (07) practical papers as mentioned below were recommended for adoption in IKGPTU from 2018-19.

S.No.	Groups	Related Branches	Course codes	Course title	Credits
1	Civil Engineering	1. Civil Engineering	BTPH101	Mechanics of solids	4
		2. Construction Engineering &	BTPH111	Mechanics of solids	1.5

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1/3

		Management		Lab	
2	Electrical Engineering	1. Electrical Engineering	BTPH102	Optics and Modern Physics	4
		2. Automation & Robotics	BTPH112	Optics and Modern Physics Lab	1.5
		3. Electrical & Electronics Engineering			
		4. Electronics & Electrical Engineering			
		5. Electrical Engineering & Industrial Control			
		6. Instrumentation & Control Engineering			
3	Mechanical Engineering	1. Mechanical Engineering	BTPH103	Electromagnetism	4
		2. Marine Engineering	BTPH113	Electromagnetism Lab	1.5
		3. Production Engineering			
		4. Industrial Engineering			
		5.Tool Engineering			
		6. Automobile Engineering			
		7. Aerospace Engineering			
		8. Aeronautical Engineering			
	B.Tech (Mechanical Engineering)-2nd Year	1. Mechanical Engineering	BTPH201	Optics and Waves	4
4	Computer Science Engineering	1.Computer Engineering	BTPH104	Semi-Conductor Physics	4
		2.Computer Science Engineering	BTPH114	Semi-Conductor Physics Lab	1.5
		3.Information technology			
		4.3D Animation Engineering			
5	Electronics and communication Engineering	1. Electronics & Communication Engineering	BTPH105	Introduction to Semiconductor Physics	4
		2. Electronics & Computer Engineering	BTPH115	Semi-Conductor Physics Lab	1.5
		3. Electronics & Instrumentation Engineering			
		4. Electronics & Telecomm Engineering			
		5. Electronics Engineering			
6	Chemical Sciences	1. Chemical Engineering	BTPH106	Optics and Electromagnetism	4
		2. Petrochem & Petroleum Refinery Engineering	BTPH116	Optics and Electromagnetism Lab	1.5
		3. Textile Engineering			
		4. Food Technology			
7	Bio Technology	1. Bio-Technology	BTPH107	Introduction to Physics: Biotechnology	4
			BTPH117	Physics Lab	1.5

BOS members also approved one course on Optics and Waves for B.Tech-Mechanical Engineering (2nd Year) as recommended by AICTE. The copy of approved syllabus for different branches is attached as **Annexure A**.

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Agenda item 2: To consider the revision of Course outcomes of M.Sc. (Physics) as per NAAC requirements

All BoS members discussed the educational objectives of the M.Sc.(Physics) course and with vision of the Department of Physical Sciences. After incorporating suggestions, BOS members approved the Vision, Mission, Program Educational objectives (PEO), Program outcome (PO), Program specific outcomes and Course outcomes(CO) of course subjects for M.Sc. (Physics) w.e.f. 2018-19. The copy of the revised scheme and syllabus with PO and COs is enclosed as Annexure B.

Agenda item 3: To consider the Revision in Course Scheme and Syllabus of M. Tech. (Nanotechnology)

The scheme and syllabus for M. Tech. (**Nanotechnology**) could not discussed in the meeting and shall be considered in the next BOS meeting.

Dr. Amit Sarin
Chairperson- BoS, Physical Sciences

Dean Academics

Head
Department of Physical Sciences
I.K. Gujral Punjab Technical University
Main Campus

ZZZ

M.Sc. Physics

Course Structure and Syllabus

(Based on Choice Based Credit System)

2018 onwards

Head
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I.K. Gujral Punjab Technical University
Main Campus

ZZZ

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World

MISSION

- To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and
- To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies;
- To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;

Head
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I.K. Gujral Punjab Technical University
Main Campus

P2

ZZZ

- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;
- To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;
- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;
- To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

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Main Campus

DEPARTMENT OF PHYSICAL SCIENCES

VISION

To be a knowledge nerve centre in Physical Sciences, Pure and Applied Research and industry requirements for creating sustainable infrastructure and enhancing quality of life

MISSION

1. To offer globally-relevant, industry-linked, research-focused, technology-enabled seamless education at the graduate, postgraduate and research levels in various areas of Physical sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global scientific and technological needs, is motivated to give its best and is committed to the growth of the Nation;
2. To develop and conduct continuing education programmes for Science graduates with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core specialization of the University;
3. To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit.

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M.Sc. (Physics) Program

Duration: 2 Years (Semester System)

This M.Sc. (Physics) Program includes various core, electives, and other interdisciplinary courses. The diverse lab experiments allow students to understand the fundamental aspects of the subject. A choice of advanced elective courses offers a glimpse in the frontier areas of research and allow students to work on one-year research project as an integral part of their M.Sc. programme. The programme also provide adequate exposure to the students for pursuing higher education in the field of technology (M. Tech.), Physics (M.Phil./Ph.D.) and other job opportunities in academia and industry.

Eligibility:

Pass B.Sc. with 50% marks having Physics as one of the subject. A relaxation of 5% is given in case of candidates belonging to SC/ST category.

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PROGRAM EDUCATIONAL OBJECTIVES: The Program Educational Objectives are the knowledge skills and attitudes which the students have at the time of post-graduation. At the end of the program, the student will be able to:

PEO1	Apply the scientific knowledge of Physics, Mathematics, Chemistry, and Physics specialization for deeper understanding of the nature.
PEO2	Identify, formulate, research literature, and analyze advanced scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PEO3	Design solutions for advanced scientific problems and design system components or processes.
PEO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PEO5	Create, select, and apply appropriate techniques, resources, and modern scientific and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PEO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional scientific practice.
PEO7	Communicate effectively on complex Scientific activities with the Scientific/engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PEO8	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific and technological change.

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Main Campus

PROGRAM OUTCOMES: At the end of the program, the student will be able to:

PO1	Apply principles of basic science concepts in understanding, analysis and prediction of physical systems.
PO2	To introduce interdisciplinary subjects/concepts/ideas for interdisciplinary application of Physics concepts.
PO3	To introduce advanced ideas and techniques required in emergent area of Physics.
PO4	To develop human resource with specialization in theoretical and experimental techniques required for career in academia and industry.
PO5	Engage in lifelong learning and adapt to changing professional and societal needs.

PROGRAM SPECIFIC OUTCOMES: At the end of the program, the student will be able to:

PSO1	Understand and apply principles of physics for understanding the scientific phenomenon in classical domain.
PSO2	Understand and apply mathematical techniques for describing and deeper understanding of physical systems.
PSO3	Understand and apply statistical methods for describing the classical and quantum particles in various physical systems and processes.
PSO4	Understand and apply inter-disciplinary concepts and computational skills for understanding and describing the natural phenomenon.
PSO5	Understand and apply principles of Quantum mechanics for understanding the physical systems in quantum realm.
PSO6	Provide exposure in various specialization of Physics (Solid State Physics/Nuclear Physics/Particle Physics).
PSO7	Provide exposure to advanced experimental/theoretical methods for measurement, observation, and fundamental understanding of physical phenomenon/systems.
PSO8	Engage in research and life-long learning to adapt to changing environment.

SEMESTER FIRST

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		

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MSPH411-18	Mathematical Physics-I	3	1	-	30	70	100	4
MSPH412-18	Classical Mechanics	3	1	-	30	70	100	4
MSPH413-18	Quantum Mechanics-I	3	1	-	30	70	100	4
MSPH414-18	Electronics	3	1	-	30	70	100	4
MSPH415-18	Computational Physics	3	1	-	30	70	100	4
MSPH416-18	Electronics Lab	-	-	6	50	25	75	3
MSPH417-18	Computational Physics Lab-I	-	-	6	50	25	75	3
TOTAL		**15**	**5**	**12**	**250**	**400**	**650**	**26**

SEMESTER SECOND

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH421-18	Mathematical Physics-II	3	1	-	30	70	100	4
MSPH422-18	Statistical Mechanics	3	1	-	30	70	100	4
MSPH423-18	Quantum Mechanics-II	3	1	-	30	70	100	4
MSPH424-18	Classical Electrodynamics	3	1	-	30	70	100	4
MSPH425-18	Atomic and Molecular Physics	3	1	-	30	70	100	4
MSPH426-18	Atomic, Nuclear, and Particle Physics Lab	-	-	6	50	25	75	3
MSPH427-18	Computational Physics Lab-II	-	-	6	50	25	75	3
	TOTAL	**15**	**5**	**12**	**250**	**400**	**650**	**26**

L: Lectures T: Tutorial P: Practical

SEMESTER THIRD

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH531-18	Condensed Matter Physics	3	1	-	30	70	100	4
MSPH532-18	Nuclear Physics	3	1	-	30	70	100	4

Head Department of Physical Sciences I.K. Gujral Punjab Technical University Main Campus

MSPH533-18	Particle Physics	3	1	-	30	70	100	4
MSPH534-18 MSPH535-18 MSPH536-18	Elective Subject-I	3	1	-	30	70	100	4
MSPH537-18 MSPH538-18 MSPH539-18	Elective Subject-II	3	1	-	30	70	100	4
MSPH540-18	Condensed Matter Physics Lab	-	-	6	50	25	75	3
TOTAL		**15**	**5**	**6**	**200**	**375**	**575**	**23**

SEMESTER FOURTH

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH541-18 MSPH542-18 MSPH543-18	Elective Subject-III	3	1	-	30	70	100	4
MSPH544-18 MSPH545-18	Elective Subject-IV	3	1	-	30	70	100	4
MSPH546-18	M.Sc. Research Project	12			Satisfactory/Unsatisfactory			12
TOTAL		6	14		60	140	200	20

TOTAL NUMBER OF CREDITS = 95

LIST OF DEPARTMENTAL/INTERDISCIPLINARY ELECTIVES

Elective Subject-I

S. No.	Name of the Subject	Code
1	Fibre optics and non-linear optics	MSPH534-18
2	Plasma Physics	MSPH535-18
3	Nonlinear Dynamics	MSPH536-18

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Elective Subject -II

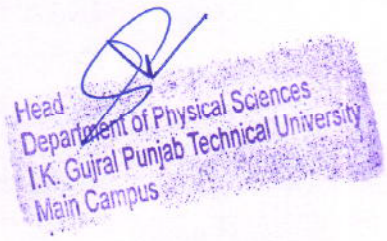
1	Radiation Physics	MSPH537-18
2	Structures, Spectra and Properties of Biomolecules	MSPH538-18
3	Science of Renewable source of Energy	MSPH539-18

Elective-III

S.No.	Name of the Subject	Code
1	Physics of Nanomaterials	MSPH541-18
2	Experimental techniques in Nuclear and Particle Physics	MSPH542-18
3	Superconductivity and Low Temperature Physics	MSPH543-18

Elective-IV

1	Advanced Condensed Matter Physics	MSPH544-18
2	Advanced Particle Physics	MSPH545-18



Examination and Evaluation

Theory			
S. No.	**Evaluation criteria**	**Weightage in Marks**	**Remarks**
1.	Mid term/sessional Tests	20	Internal evaluation (30 Marks) MSTs, Quizzes, assignments, attendance, etc. constitute internal evaluation. Best of two mid semester test will be considered for evaluation.
2	Attendance	5	
3	Assignments	5	
4	End semester examination	70	External evaluation (70 Marks) Conduct and checking of the answer sheets will at the Department level in case of University teaching Department or Autonomous institutions. For other colleges examination will be conducted at the university level.
5	Total	100	Marks may be rounded off to nearest integer.
Practical			
1	Daily evaluation of practical record/Viva Voice	30	Internal evaluation (50 Marks)
2	Attendance	5	
3	Seminar/Presentation	15	
4	Final Practical Performance + Viva Voice	25	External evaluation (25 Marks)
5	Total	75	Marks may be rounded off to nearest integer.

MSPH411-18	**MATHEMATICAL PHYSICS-I**	**L-3, T-1, P-0**	**4 Credits**

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Main Campus

Annexure 1.1.2 & 1.2.2 (iii)

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IK Gujral Punjab Technical University, Kapurthala
Department of Physical Sciences

Ref No.: IKGPTU/PS/1990 Date: 15/04/2019.

Subject: Proceedings of the Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) meeting held on 29.03.2019.

A meeting of members of Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) was held on 29.03.2019 in the Department of Physical Sciences, I K Gujral Punjab Technical University, Kapurthala. The agenda of the meeting was discussed in detail and recommendations were made on point. The proceedings of the meetings were recorded in the minutes of the meeting as enclosed as an Annexure -1.

Submitted for necessary action.

Convener- BoS
Dr. Neetika

Chairman, Board of Studies
Head, Physical Sciences.

Head
Department of Physical Sciences
I.K. Gujral Punjab Technical University
Main Campus

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I.K. Gujral Punjab Technical University, Kapurthala

Department of Physical Sciences

Ref No: IKGPTU/PS/1989 Dated: 15/04/2019

Minutes of Meeting

A meeting of members of Board of Studies (BoS), Physical Sciences (Material Science/Nano Science and Technology) was held on 29.03.2019 in the Department of Physical Sciences, I K Gujral Punjab Technical University, Kapurthala.

Following members of BOS and special invitees were present and actively participated in discussion:

1. Dr. Amit Sarin (Chairperson)
2. Dr. R. K. Bedi, Member
3. Dr Rakesh Dogra, Member
4. Dr. Hitesh Sharma, Member
5. Dr. Gaurav Bhargava, (Special invitee)
6. Dr. Maninder Kaur, Member
7. Dr. Jagmeet Bawa, (Special invitee)
8. Dr. Priyanka Mahajan, (Special invitee)
9. Dr. Sarabjit Singh Mann, (Special invitee)
10. Dr. Varinderjit Singh (Special invitee)
11. Dr. Neetika (Special invitee)
12. S. Navdeepak Sandhu, Member
13. Mr. Gurcharan Singh, M.Sc. (2nd Year)-Student representative
14. Mr. Nikhil M.Sc. (2nd Year)-Student representative

The following members could not attend the meeting:

1. Dr. Davinder Mehta, Member
2. Dr. Harpreet Kaur Grewal, Member
3. Dr. Kanchan L Singh, Member
4. Dr. B D Gupta, Member
5. Dr. Rajiv Malhotra, Member
6. Dr. P. Arumugam, Member
7. Dr. Ravi Kumar, Member
8. Dr. Arvind Kumar, Member
9. Dr. Ranjan Kumar, Member
10. Dr. Ashish Arora, (Special invitee)

Head
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Main Campus

The Board of Studies discussed on all the agenda points and following recommendations were made:

Agenda item 1: To consider the revision of Program Educational objectives (PEO), Program outcomes (POs), Program specific outcomes (PSOs) and Course outcomes of M.Sc. (Physics) course

All BoS members discussed the Program Educational objectives (PEO), Program outcomes (POs), Program specific outcomes (PSOs) of the M.Sc. (Physics) course and with vision of the Department of Physical Sciences. After incorporating suggestions, BOS members recommended the Program Educational objectives (PEO), Program outcomes (POs), Program specific outcomes (PSOs) and Course outcomes (COs) of various subjects for M.Sc. (Physics) w.e.f. 2018-19. **The copy of revised scheme and syllabus with revised PEOs, POs, PSOs, and COs is enclosed as Annexure A.**

Agenda item 2: To consider the syllabus of inter disciplinary value-added course on Personality Development for Main Campus

All BoS members discussed the syllabus of inter disciplinary value-added course on Personality Development for M.Sc. Physics students. The syllabus for audit course is designed by the Dr. Priyanka Mahajan. Board members agreed that more interdisciplinary course on Human values, Management, etc., may be added in near future. The copy of finalized syllabus of Personality Development is enclosed as Annexure-B.

Agenda item 3: To consider the study scheme and syllabus of B. Sc. (Hons) Physics for the first two semesters in the academic session 2019-2020

All BoS members discussed the study scheme of B Sc. (Hons) Physics and syllabus of 1st and 2nd semester starting from the academic session 2019-2020 in the IKGPTU Main Campus. Board members agreed that two physics core courses with their respective labs will be offered in first two semesters. Proposed study scheme and physics courses syllabus is attached here as Annexure-C. Further subject codes and open elective subjects will be discussed in the next BOS meeting.

Agenda item 4: To consider the courses on skill and employability enhancement related.

All BoS members discussed and recommended that theory and lab courses on Mathematical Physics, Electronics, Computational, Statistical, Nuclear, Condensed matter, Renewable energies, and Dissertation are essential for the employability enhancement of M.Sc. Physics students.

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I.K. Gujral Punjab Technical University
Main Campus

Agenda item 5: To consider syllabus of new courses in PhD Course works

All BoS members discussed and recommended the syllabus of new courses on 1) Advanced Particle Physics and 2) Renewable Energy Resources in the Curriculum of Ph. D course work as per the specialization available in the Department of Physical Sciences. The copy of approved syllabus of Advance Particle Physics and Renewable Energy Resources is enclosed as Annexure-D.

Dr. Amit Sarin
Chairperson- BoS, Physical Sciences

Dean Academics

Head
Department of Physical Sciences
I.K. Gujral Punjab Technical University
Main Campus

Annexure-A

M.Sc. Physics

Course Structure and Syllabus

(Based on Choice Based Credit System)

2018 onwards



IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, socio-cultural upliftment and overall prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

- To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and
- To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, undergraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies.

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I.K. Gujral Punjab Technical University
Main Campus

- To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;
- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;
- To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;
- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio-visual, the video and computer-based modes;
- To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

Department of Physical Sciences
I.K. Gujral Punjab Technical University
Main Campus

DEPARTMENT OF PHYSICAL SCIENCES

VISION

To be a knowledge nerve centre in Physical Sciences, Pure and Applied Research and industry requirements for creating sustainable infrastructure and enhancing quality of life

MISSION

1. To offer globally-relevant, industry-linked, research-focused, technology-enabled seamless education at the graduate, postgraduate and research levels in various areas of Physical sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global scientific and technological needs, is motivated to give its best and is committed to the growth of the Nation;
2. To develop and conduct short term education programmes for Science graduates with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of the specialization of the University,
3. To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit.

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M.Sc. (Physics) Program

Duration: 2 Years (Semester System)

This M.Sc. (Physics) Program includes various core, electives, and other interdisciplinary courses. The diverse lab experiments allow students to understand the fundamental aspects of the subject. A choice of advanced elective courses offers a glimpse in the frontier areas of research and allow students to work on research project as an integral part of their M.Sc. program. The program also provides adequate exposure to the students for pursuing higher education in the field of technology, research and development in Physics and related areas (M.Phil./Ph.D.) and other job opportunities in academia and industry.

Eligibility:

Pass B.Sc. with 50% marks having Physics as one of the subject. A relaxation of 5% is given in case of candidates belonging to SC/ST category.

PROGRAM EDUCATIONAL OBJECTIVES: At the end of the program, the student will be able to:

PEO1	Apply principles of basic scientific concepts in understanding, analysis, and prediction of physical systems.
PEO2	To develop human resource with specialization in theoretical and experimental techniques required for career in academia, research and industry.
PEO3	Engage in lifelong learning and adapt to changing professional and societal needs.



PROGRAM OUTCOMES: At the end of the program, the student will be able to:

PO1	Apply the scientific knowledge to solve the complex physics problems.
PO2	Identify, formulate, and analyze advanced scientific problems reaching substantiated conclusions using first principles of mathematics, physical, and natural sciences.
PO3	Design solutions for advanced scientific problems and design system components or processes that meet the specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal consideration.
PO4	Use research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Create, select, and apply appropriate techniques, resources, and modern scientific tools to complex physics problems with an understanding of the limitations.
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional scientific practice.
PO7	Understand the impact of the scientific solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to the norms of scientific practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communicate effectively on scientific activities with the Scientific/Engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of the scientific principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES: At the end of the program, the student will be able to:

PSO1	Understand the basic and advanced concepts of different branches of physics.
PSO2	Perform and design experiments in the areas of electronics, atomic, nuclear, condensed matter and experimental physics.
PSO3	Apply the concepts of physics in the multidisciplinary areas of renewable energies, particle physics, astronomy, academia, industry.

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SEMESTER FIRST

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH411-18	Mathematical Physics-I	3	1	-	30	70	100	4
MSPH412-18	Classical Mechanics	3	1	-	30	70	100	4
MSPH413-18	Quantum Mechanics-I	3	1	-	30	70	100	4
MSPH414-18	Electronics	3	1	-	30	70	100	4
MSPH415-18	Computational Physics	3	1	-	30	70	100	4
MSPH416-18	Electronics Lab	-	-	6	50	25	75	3
MSPH417-18	Computational Physics Lab-I	-	-	6	50	25	75	3
TOTAL		15	5	12	250	400	650	26

SEMESTER SECOND

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH421-18	Mathematical Physics-II	3	1	-	30	70	100	4
MSPH422-18	Statistical Mechanics	3	1	-	30	70	100	4
MSPH423-18	Quantum Mechanics-II	3	1	-	30	70	100	4
MSPH424-18	Classical Electrodynamics	3	1	-	30	70	100	4
MSPH425-18	Atomic and Molecular Physics	3	1	-	30	70	100	4
MSPH426-18	Atomic, Nuclear, and Particle Physics Lab	-	-	6	50	25	75	3
MSPH427-18	Computational Physics Lab-II	-	-	6	50	25	75	3
	TOTAL	15	5	12	250	400	650	26

L: Lectures T: Tutorial P: Practical

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SEMESTER THIRD

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH531-18	Condensed Matter Physics	3	1	-	30	70	100	4
MSPH532-18	Nuclear Physics	3	1	-	30	70	100	4
MSPH533-18	Particle Physics	3	1	-	30	70	100	4
MSPH534-18 MSPH535-18 MSPH536-18	Elective Subject-I	3	1	-	30	70	100	4
MSPH537-18 MSPH538-18 MSPH539-18	Elective Subject-II	3	1	-	30	70	100	4
MSPH540-18	Condensed Matter Physics Lab	-	-	6	50	25	75	3
TOTAL		15	5	6	200	375	575	23

SEMESTER FOURTH

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MSPH541-18 MSPH542-18 MSPH543-18	Elective Subject-III	3	1	-	30	70	100	4
MSPH544-18 MSPH545-18 MSPH546-18	Elective Subject-IV	3	1	-	30	70	100	4
MSPH547-18	Dissertation		12		230	170	300*	12
TOTAL		6	14		260	240	500	20

*Evaluation criteria as and when adopted by DUGPTU

TOTAL NUMBER OF CREDITS = 95

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LIST OF DEPARTMENTAL/INTERDISCIPLINARY ELECTIVES

Elective Subject-I

S. No.	Name of the Subject	Code
1	Fibre optics and non-linear optics	MSPH534-18
2	Radiation Physics	MSPH535-18
3	Nonlinear Dynamics	MSPH536-18

Elective Subject -II

S.No.	Name of the Subject	Code
1	Plasma Physics	MSPH537-18
2	Structures, Spectra and Properties of Biomolecules	MSPH538-18
3	Science of Renewable Source of Energy	MSPH539-18

Elective-III

S.No.	Name of the Subject	Code
1	Physics of Nanomaterials	MSPH541-18
2	Experimental Techniques in Nuclear and Particle Physics	MSPH542-18
3	Superconductivity and Low Temperature Physics	MSPH543-18

Elective-IV

	Name of the Subject	Code
1	Advanced Condensed Matter Physics	MSPH544-18
2	Advanced Particle Physics	MSPH545-18
3	Environment Physics	MSPH546-18

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Examination and Evaluation

Theory			
S. No.	Evaluation criteria	Weightage in Marks	Remarks
1	Mid term/sessional Tests	20	Internal evaluation (20 Marks)
2	Attendance	5	MSTs, Quizzes, assignments, attendance, etc., constitute internal evaluation. Average of two mid semester test will be considered for evaluation.
3	Assignments	5	
4	End semester examination	70	External evaluation (70 Marks) Conduct and checking of the answer sheets will at the Department level in case of University teaching Department or Autonomous Institutions. For other colleges examination will be conducted at the University level.
5	Total	100	Marks may be rounded off to nearest integer.
Practical			
1	Evaluation of practical record/ Viva Voice	30	Internal evaluation (50 Marks)
2	Attendance	5	
3	Seminar/Presentation	15	
4	Final Practical Performance – Viva Voice	25	External evaluation (25 Marks)
5	Total	75	Marks may be rounded off to nearest integer.

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<table>
<tr><td colspan="7">Internal Assessment</td></tr>
<tr><td rowspan="2">Departmental Presentation</td><td colspan="2">Communication and presentation</td><td colspan="2">Response to queries</td><td>Maximum Marks</td><td>Evaluated by</td></tr>
<tr><td colspan="2">20</td><td colspan="2">30</td><td>50</td><td>Committee Member: 1.Head 2.Supervisor 3.One of Faculty Member</td></tr>
<tr><td rowspan="2">Dissertation</td><td>Plagiarism</td><td>Subject Matter</td><td>Usage of Language</td><td>Publication/Presentation in Conference</td><td rowspan="2">150</td><td rowspan="2"></td></tr>
<tr><td>25</td><td>70</td><td>25</td><td>30</td></tr>
<tr><td colspan="7">External Assessment</td></tr>
<tr><td rowspan="2">External Examiner</td><td colspan="4">Subject Matter</td><td rowspan="2">50</td><td rowspan="2"></td></tr>
<tr><td colspan="4">50</td></tr>
<tr><td rowspan="2">Viva Voce</td><td colspan="2">Communication and Presentation</td><td colspan="2">Response to queries</td><td rowspan="2">50</td><td rowspan="2">Committee Member: 1.Head 2.External Expert 3.Supervisor 4. Director (MC) nominee</td></tr>
<tr><td colspan="2">20</td><td colspan="2">30</td></tr>
<tr><td colspan="5">Total</td><td>300</td><td></td></tr>
</table>

Evaluation Process:

1. The subject matter evaluation can further be defined on the basis of Title, Review of literature/Motivation, Objectives, Methodology, Results and discussions, and Conclusion.
2. The usage of language and the subject matter shall be evaluated by the supervisor. Out of 300 marks, 95 marks are to be evaluated by the concerned supervisor.
3. Total 15% Plagiarism is admissible for submission of the dissertation. For (0-5)%of plagiarism, candidate should be awarded 25 marks. For >5%-10% candidate should be awarded 15 marks and for the range of > 10% to < 15%, candidate should be awarded 5 marks.
4. For publication candidate should be awarded full 30 marks and for presenting the work related to dissertation, candidate should be awarded 25 marks.

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