



FOUR YEAR UNDER GRADUATE PROGRAM  
UNDER  
JAMSHEDPUR WOMEN'S UNIVERSITY  
  
PHYSICS HONOURS/RESEARCH  
IMPLEMETED FROM 2022

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### HIGHLIGHTS OF REGULATIONS OF FYUGP

#### PROGRAMME DURATION

- The Full-time, Regular UG programme for a regular student shall be for a period of four years with multiple entries and multiple exit options.

#### ELIGIBILITY

- The selection for admission will be primarily based on availability of seats in the Major subject and marks imposed by the institution. Merit point for selection will be based on marks obtained in Major subject at Class 12 (or equivalent level) or the aggregate marks of Class 12 (or equivalent level) if Marks of the Major subject is not available. Reservation norms of The Government of Jharkhand must be followed as and when amended in times.

#### ADMISSION PROCEDURE

- The reservation policy of the Government of Jharkhand shall apply in admission and the benefit of the same shall be given to the candidates belonging to the State of Jharkhand only. The candidates of other states in the reserved category shall be treated as General category candidates. Other relaxations or reservations shall be applicable as per the prevailing guidelines of the University for FYUGP.

#### ACADEMIC CALENDAR

- Each year the University shall draw out a calendar of academic and associated activities, which shall be strictly adhered to. The same is non-negotiable. Further, the Department will make all reasonable endeavors to deliver the programmes of study and other educational services as mentioned in its Information Brochure and website. However, circumstances may change prompting the Department to reserve the right to change the content and delivery of courses, discontinue or combine courses and introduce or withdraw areas of specialization.

#### PROGRAMME OVERVIEW/ SCHEME OF THE PROGRAMME

- Undergraduate degree programmes of either 3 or 4-year duration, with multiple entries and exit points and re-entry options within this period, with appropriate certifications such as:
  - a Certificate after completing 1 year (2 semesters) of study in the chosen fields of study,
  - a Diploma after 2 years (4 semesters) of study,
  - a Bachelor after a 3-year (6 semesters) programme of study,
  - a Bachelor (with Hons. / Research) after a 4-year (8 semesters) programme of study

#### VALIDITY OF REGISTRATION

- Validity of a registration for FYUGP will be for maximum for Seven years from the date of registration.

### CALCULATION OF MARKS FOR THE PURPOSE OF RESULT

- Student's final marks and the result will be based on the marks obtained in Semester Internal Examination and End Semester Examination organized taken together.
- Passing in a subject will depend on the collective marks obtained in Semester internal and End Semester University Examination both. However, students must pass in Theory and Practical Examinations separately.

### PROMOTION AND SPAN PERIOD

- The Requisite Marks obtained by a student in a particular subject will be the criteria for promotion to the next Semester.
- To get promotion from Semester-II to Semester-III a student will be required to pass in at least 75% of Courses in an academic year (a student has to pass in minimum 9 papers out of the total 12 papers. However, it will be necessary to procure pass marks in each of the paper before completion of the course.
- To get promotion from Semester-IV to Semester-V (taken together of Semester I, II, III & IV) a student has to pass in minimum 16 papers out of the total 22 papers.
- Eligibility to get entry in Semester VII is to secure a minimum of 7.5 CGPA up to semester VI along with other criteria imposed by the Institution.

### PUBLICATION OF RESULT

- The result if the examination shall be notified by the Controller of Examinations of the University in different newspapers and also on University website.
- If a student is found indulged in any kind of malpractice during examination, the examination taken by the student will be cancelled. The candidate will be awarded zero marks in that paper. The candidate may re-appear in the subsequent semesters as per the available provisions.
- There shall be no Supplementary or Re-examination for any subject. Students who have failed in any subject in an even semester may appear in the subsequent even semester examination for clearing the backlog. Similarly, the students who have failed in any subject in an odd semester may appear in the subsequent odd semester examination for clearing the backlog.
- Regulation related with any concern not mentioned above shall be guided by the Regulations of the University for FYUGP.



Jharkhand, NEP, FYUGP 2022 onwards

**Table 2: Course structure for Undergraduate Certificate Programme [May Exit after Sem.-II]**

Semester	Common Courses			Introductory Courses		Major	Total Credits
Sem.-I	LCS (MIL/TRL)  (6 Credits)	Understanding India  (2 Credits)	Health & Wellness, Yoga Education, Sports & Fitness (2 Credits)	IRC-1  (3 Credits)	IVS-1A  (3 Credits)	MJ-1  (6 Credits)	(22)
Sem.-II	LCS (English)  (6 Credits)	Global Citizenship Education (2 Credits)	Mathematical & Computational Thinking (2 Credits)	IRC-2  (3 Credits)	IVS-1B  (3 Credits)	MJ-2  (6 Credits)	(22)

**Total = 44 Credits**

(LCS: Language and Communication Skills; MIL: Modern Indian Languages; TRL: Tribal Regional Languages;

IRC: Introductory Regular Courses; IVS: Introductory Vocational Studies, MJ: Major)

**Table 3: Course structure for Undergraduate Diploma Programme [May Exit after Sem.-IV]**

Semester	Common Courses			Introductory Courses	Major	Minor	Internship/ Project	Vocational	Total Credits
Sem.-III	Environmental Studies  (3 Credits)	Community Engagement/ NCC/ NSS (3 Credits)	Digital Education  (3 Credits)	IRC-3  (3 Credits)	MJ-3  (6 Credits)		Internship/ Project  (4 Credits)		(22)
Sem.-IV					MJ-4, MJ-5 (6+6=12 Credits)	MN-1 (6 Credits)		VS-1 (4 Credits)	(22)

**Total = 88 Credits**

(MN: Minor; VS: Vocational Studies)

**Table 4: Course structure for Bachelor's Degree Programme***[May Exit after Sem.-VI]*

Semester	Major Courses	Minor Courses	Vocational	Total Credits
Sem.-V	MJ-6, MJ-7 (6+6 = 12 Credits)	MN-2 (6 Credits)	VS-2 (4 Credits)	(22)
Sem.-VI	MJ-8, MJ-9 (6+6= 12 Credits)	MN-3 (6 Credits)	VS-3 (4 Credits)	(22)

**Total = 132 Credits****Table 5: Course structure for Bachelor's Degree with Hons./Research Programme**

Semester	Advance Courses	Research Courses	Vocational	Total Credit
Sem.-VII	AMJ-1, AMJ-2 (6+6=12 Credits)	Research Methodology (6 Credits)	Research Proposal (4 Credits)	(22)
Sem.-VIII	AMJ-3, AMJ-4 (6+6=12 Credits)	Research Int./Field Work (4 Credits)	Research Report (4 Credits)	VSR  (2 Credits)

**Total = 176 Credits**

(AMJ: Advance Major; VSR: Vocational Studies associated with Research)

**SEMESTER WISE COURSES OF STUDY FOR FOUR YEAR UNDERGRADUATE PROGRAMME**

Semester	Common, Introductory, Major, Minor, Vocational & Internship Courses		Credits
	Code	Paper	
I	CC-1	Language and Communication Skills (Modern Indian language including TRL)	6
	CC-2	Understanding India	2
	CC-3	Health & Wellness, Yoga Education, Sports & Fitness	2
	IRC-1	Introductory Regular Course-1	3
	IVS-1A	Introductory Vocational Studies-1	3
	MJ-1	Major paper 1 (Disciplinary/Interdisciplinary Major)	6
II	CC-4	Language and Communication Skills (English)	6
	CC-5	Mathematical & Computation Thinking Analysis	2
	CC-6	Global Citizenship Education & Education for Sustainable Development	2
	IRC-2	Introductory Regular Course-2	3
	IVS-2B	Introductory Vocational Studies-2	3
	MJ-2	Major paper 2 (Disciplinary/Interdisciplinary Major)	6
III	CC-7	Environmental Studies	3
	CC-8	Digital Education (Elementary Computer Applications)	3
	CC-9	Community Engagement & Service (NSS/ NCC/ Adult Education)	3
	IRC-3	Introductory Regular Course-3	3
	IAP	Internship/Apprenticeship/ Project	4
	MJ-3	Major paper 3 (Disciplinary/Interdisciplinary Major)	6
IV	MJ-4	Major paper 4 (Disciplinary/Interdisciplinary Major)	6
	MJ-5	Major paper 5 (Disciplinary/Interdisciplinary Major)	6
	MN-1	Minor Paper 1 (Disciplinary/Interdisciplinary Minor)	6
	VS-1	Vocational Studies-1 (Minor)	4
V	MJ-6	Major paper 6 (Disciplinary/Interdisciplinary Major)	6
	MJ-7	Major paper 7 (Disciplinary/Interdisciplinary Major)	6
	MN-2	Minor Paper 2 (Disciplinary/Interdisciplinary Minor)	6
	VS-2	Vocational Studies 2 (Minor)	4
VI	MJ-8	Major paper 8 (Disciplinary/Interdisciplinary Major)	6
	MJ-9	Major paper 9 (Disciplinary/Interdisciplinary Major)	6
	MN-3	Minor Paper 3 (Disciplinary/Interdisciplinary Minor)	6
	VS-3	Vocational Studies 3 (Minor)	4
VII	AMJ-1	Advance Major paper 1 (Disciplinary/Interdisciplinary Major)	6
	AMJ-2	Advance Major paper 2 (Disciplinary/Interdisciplinary Major)	6



	RC-1	Research Methodology	6
	RC-2	Research Proposal	4
VIII	AMJ-3	Advance Major paper 3 (Disciplinary/Interdisciplinary Major)	6
	AMJ-4	Advance Major paper 4 (Disciplinary/Interdisciplinary Major)	6
	RC-3	Research Internship/Field Work	4
	RC-4	Research Report	4
	VSR	Vocational Studies (Associated with Research)	2
		Total Credit	176

Abbreviations:

CC Common Courses

IRC Introductory Regular Courses

IVS Introductory Vocational Studies

IAP Internship/Apprenticeship/ Project

VS Vocational Studies

MJ Major Disciplinary/Interdisciplinary Courses

MN Minor Disciplinary/Interdisciplinary Courses

AMJ Advance Major Disciplinary/Interdisciplinary Courses

RC Research Courses

VSR Vocational Studies associated with Research

## SEMESTER WISE COURSES IN PHYSICS FOR FYUGP

## Semester wise Examination Structure in Discipline Courses:

Semester	Common, Introductory, Major, Minor, Vocational & Internship Courses		Examination Structure			
	Code	Papers	Credits	Mid Semester Theory (F.M.)	End Semester Theory (F.M.)	End Semester Practical/ Viva (F.M.)
I	MJ-1	Mathematical Physics – I (Theory + Lab)	6			
II	MJ-2	Mechanics and Thermal Physics (Theory + Lab)	6			
III	MJ-3	Mathematical Physics – II (Theory + Lab)	6			
IV	MJ-4	Electricity and Magnetism (Theory + Lab)	6			
	MJ-5	Basic Electronics and Applications (Theory + Lab)	6			
V	MJ-6	Quantum Mechanics and elements of modern Physics (Theory + Lab)	6			
	MJ-7	Solid State Physics (Theory and Lab)	6			
VI	MJ-8	Electromagnetic Theory, Waves and Optics (Theory + Lab)	6			
	MJ-9	Statistical Mechanics (Theory and Lab)	6			
VII	AMJ-1	Physics of devices and Instruments (Theory + Lab)	6			
	AMJ-2	Advance Mathematical Physics (Theory + Lab)	6			
	RC-1	Research Methodology	6			
	RC-2	Research Proposal	4			
VIII	AMJ-3	Classical Dynamics (Theory + Lab)	6			
	AMJ-4	Nuclear and Particle Physics (Theory + Lab)	6			

	RC-3	Research Internship/Field Work	4			
	RC-4	Research Report	4			
	VSR	Vocational Studies (Associated with Research)	2			
	Total Credit		98			

## Semester wise Course Code and Credit Points:

Semester	Common, Introductory, Major, Minor, Vocational & Internship Courses		Examination Structure			
	Code	Papers	Credits	Mid Semester Theory (F.M.)	End Semester Theory (F.M.)	End Semester Practical/ Viva (F.M.)
I/II/III	IRC	Introductory Physics	3			
IV	MN-1	Electricity and Magnetism	6			
V	MN-2	Thermal Physics	6			
VI	MN-3	Wave and Optics	6			
	Total Credits		21			

## AIM OF BACHELOR'S DEGREE PROGRAMME IN PHYSICS

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The FYUGP educational program in Physics aims to

- create the facilities and learning environment in educational institutions to consolidate the knowledge acquired at +2 level, motivate students to develop a deep interest in Physics, and to gain a broad and balanced knowledge and understanding of physical concepts, principles and theories of Physics.
- provide opportunities to students to learn, design and perform experiments in lab, gain an understanding of laboratory methods, analysis of observational data and report writing, and acquire a deeper understanding of concepts, principles and theories learned in the classroom through laboratory demonstration, and computational problems and modelling.
- develop the ability in students to apply the knowledge and skills they have acquired to get to the solutions of specific theoretical and applied problems in Physics.
- to prepare students for pursuing the interdisciplinary and multidisciplinary higher education and/or research in interdisciplinary and multidisciplinary areas, as Physics is among the most important branches of science necessary for interdisciplinary and multidisciplinary research.
- to prepare students for developing new industrial technologies and theoretical tools for applications in diverse branches of the economic life of the country, as Physics is one of the branches of science which contribute directly to technological development; and it has the most advanced theoretical structure to make quantitative assessments and predictions, and
- in light of all of the above to provide students with the knowledge and skill base that would enable them to undertake further studies in Physics and related areas, or in Interdisciplinary/multidisciplinary areas, or join and be successful in diverse professional streams including entrepreneurship.

### PROGRAM LEARNING OUTCOMES

Students graduating with the B.Sc. (Honours)/Research Physics degree should be able to

- Acquire
  - 1) a fundamental/systematic and coherent understanding of the academic field of basic Physics in areas like Mechanics, Electricity and Magnetism, Waves and Optics, Thermal and Statistical Physics, Quantum Mechanics, Mathematical Physics and their applications to other core subjects in Physics;
  - 2) a wide ranging and comprehensive experience in physics laboratory methods in experiments related to mechanics, optics, thermal physics, electricity, magnetism, digital electronics, solid state physics and modern physics. Students should acquire the ability for systematic observations, use of scientific research instruments, analysis of observational data, making suitable error estimates and scientific report writing;
  - 3) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics, including professionals engaged in research and development, teaching and government/public service;
  - 4) ) knowledge and skills in areas related to their specialization area corresponding to elective subjects within the disciplinary/subject area of Physics and current and emerging developments in the field of Physics.
- Demonstrate the ability to use skills in Physics and its related areas of technology for formulating and tackling Physics-related problems and identifying and applying appropriate physical principles and methodologies to solve a wide range of problems associated with Physics.
- Recognize the importance of mathematical modelling, simulation and computational methods, and the role of approximation and mathematical approaches to describing the physical world and beyond.
- Plan and execute Physics-related experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and purpose-written packages, and report accurately the findings of the experiment/investigations while relating the conclusions/findings to relevant theories of Physics.
- Demonstrate relevant generic skills and global competencies such as

- 1) problem-solving skills that are required to solve different types of Physics-related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary area boundaries; 10
  - 2) investigative skills, including skills of independent investigation of Physics-related issues and problems;
  - 3) communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences of technical or popular nature;
  - 4) analytical skills involving paying attention to detail and ability to construct logical arguments using correct technical language related to Physics and ability to translate them with popular language when needed;
  - 5) ICT skills;
  - 6) personal skills such as the ability to work both independently and in a group.
- Demonstrate professional behavior such as
    - 1) being objective, unbiased and truthful in all aspects of work and avoiding unethical, irrational behavior such as fabricating, falsifying or misrepresenting data or committing plagiarism;
    - 2) the ability to identify the potential ethical issues in work-related situations;
    - 3) be committed to the free development of scientific knowledge and appreciate its universal appeal for the entire humanity;
    - 4) appreciation of intellectual property, environmental and sustainability issues;
    - 5) promoting safe learning and working environment.