|| सा विद्या या विमुक्तये ||

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

1. B.Sc.-III Year-Biophysics
2. B.Sc.-III Year-Bioinformatics
3. B.Sc.-III Year-Biotechnology
4. B.Sc.-III Year-Biotechnology (Vocational)
5. B.Sc.-III Year-Botany
6. B.Sc.-III Year-Horticulture
7. B.Sc.-III Year-Agro Chemical Fertilizers
8. B.Sc.-III Year-Analytical Chemistry
9. B.Sc.-III Year-Biochemistry
10. B.Sc.-III Year-Chemistry
11. B.Sc.-III Year-Dyes & Drugs Chemistry
12. B.Sc.-III Year-Industrial Chemistry
13. B.C.A. (Bachelor of Computer Application)-III Year
14. B.I.T. (Bachelor of Information Technology)-III Year
15. B.Sc.-III Year-Computer Science
16. B.Sc.-III Year-Network Technology
17. B.Sc.-III Year-Computer Application (Optional)
18. B.Sc.-III Year-Computer Science (Optional)
19. B.Sc.-III Year-Information Technology (Optional)
20. B.Sc.-III Year-Software Engineering
21. B.Sc.-III Year-Dairy Science
22. B.Sc.-III Year-Electronics
23. B.Sc.-III Year-Environmental Science
24. B.Sc.-III Year-Fishery Science
25. B.Sc.-III Year-Geology
26. B. A./B.Sc.-III Year-Mathematics
27. B.Sc.-III Year-Microbiology
28. B.Sc.-III year Agricultural Microbiology
29. B.Sc.-III Year-Physics
30. B. A./B.Sc.-III Year Statistics
31. B.Sc.-III Year-Zoology

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/७५

दिनांक : १२.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :
१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

SWAMI RAMANAND TEERTH MATHAWADA UNIVERSITY, NANDED

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड.

B. Sc. Third Year Physics Syllabus
(CBCS Pattern)
Effective from Academic Year 2021-2022

Disclaimer

*Syllabus of **B. Sc. Third Year (Semesters V and VI) Physics** given in this document was prepared following requirements of the **Choice Based Credit System (CBCS)** pattern, as recommended by **UGC, New Delhi,** and has been duly approved by the **Faculty of Science and Technology, the Academic Council** and the **Management Council** of **S.R.T.M. University**. The same has been implemented from the academic year **2021-2022**.*

Preamble:

Swami Ramanand Teerth Marathwada University, Nanded, following the directives of the **University Grants Commission, New Delhi (UGC)**, has been trying hard to enhance the academic standard of this region and has taken several steps in recent past to improve the quality of higher education in its jurisdiction. These include the improvement and revision of the existing curricula in tune with the courses at national and international level, implementing innovative methods in teaching-learning processes, imparting skill based value added education, improvisation in the examination and evaluation processes, etc. These measures are very much useful in achieving **3Es, the *equity, efficiency and excellence*** in higher education of this region. However, the diversified approaches followed by different faculties and universities within India puts a limit on bringing the global equality in higher education across the country. This is because majority of universities within India follow conventional method of awarding percentage of marks for the performance of the students in their semester end examinations, in contrast to the grades awarded by the institutions of national reputes like IITs, IISERs, IISC and central universities. The scheme of conversion of the scores from percentage to point based grades and letter grades vary widely across the institutions and universities, which in turn produces a large range of disparity and difficulty in comparing performances of students graduating from different universities and institutes.

To overcome such anomalies in assessing performances of the candidates graduating from different universities UGC in recent past has undertaken an exercise of restructuring the curricula of different courses offered by various universities across the country. Though academic flexibility and autonomy is provided to the universities to design their own examination and evaluation methods best suiting the curricula and teaching–learning methods adopted in conducted and affiliated colleges, there is a global need to devise a sensible mechanism for awarding grades to the performance of students. As a result the UGC, New Delhi has suggested all the universities to adopt the grading system of computing the ***cumulative grade point average*** **(CGPA)** for assessing academic performance of the students in the university examinations. This is important not only to compare the performances of the students graduating from different universities but also provide mobility to the students in joining different institutions within India as well as in other countries. The common grading system followed by different universities also enables the potential employers to assess performances of candidates uniformly. As a result S.R.T.M.U. has adopted the ***cumulative grade point average*** **(CGPA)** system for assessing performance of students studying in its jurisdiction from the academic year 2014-2015. Further, following the suggestions by the

UGC and looking at the better employability, entrepreneurship possibilities and also to enhance the latent skills of the students SRTMU has also adopted the ***Choice Based Credit System*** **(CBCS)** at graduate as well as post-graduate level. The CBCS system offers flexibility to the students in choosing courses of their own choice from the exhaustive list comprising core, elective/minor or skill based components that are evaluated following the grading system. In the coming academic year 2021-2022 the University shall be implementing the revised syllabus of B. Sc. Third Year Physics. This document provides detailed information on methodology of choosing different components of B. Sc. Third Year (Semester V and Semester VI) Physics theory and practical courses.

The courses offered by this university are of student-centric nature and help them to understand the basic laws of nature and develop necessary skills to apply them to the advanced areas of studies. There are two common or core or mandatory courses meant to provide adequate knowledge of various branches of physics and to prepare the students for applying them for advanced courses. In addition, there will be elective courses as well as few skill based courses, which are of advanced nature and help the students to develop their skills through hands-on activities. The details of the courses and activities are as follows:

Outline of the Choice Based Credit System:

1. Discipline Specific Compulsory (DSC) Courses: Every student graduating in Science faculty with Physics as one of the optional subject is required to study these theory and practical papers as core or compulsory courses. There shall be two such theory papers (P-XII and P-XIV, each of 02 credits), one each in Semester V and VI, whose performance shall be assessed at the end of the respective semesters. There shall be one practical course corresponding to both these compulsory courses, however, the performance of candidates in the practical course shall be assessed on the annual basis i.e., at the end of the Semester VI by a pair of external examiners.

2. Discipline Specific Elective (DSE) Courses: Students have freedom to choose an advanced course of their interest and inclination from a pool of courses made available by the university for a particular semester. These courses are of specific or specialized or advanced or supportive nature and are designed such that they provide extended scope to the students or enable them to expand their knowledgebase. Every student has a freedom to elect one of such theory course of 02 credits, whose performance will be assessed at the end of the corresponding semester. These elective courses will be supplemented by practical courses each of 01 credits, however, they will be assessed following annual pattern i.e., at the end of the academic year. Attempts will also be made to offer elective courses of interdisciplinary nature from some other

subjects, disciplines, or faculties; however, for the availability of such courses the students are required to consult their teachers.

3. Skill Enhancement Courses (SEC): These courses are aimed at providing hands-on-training, competencies, skills, etc. to the students. As these courses are primarily of hands-on-training type, therefore, students are expected to devote much of their time in laboratory activities rater than the conventional classroom teaching. Therefore, one-third of the time allocated to this course will be utilized for the classroom teaching, imparting instructions, etc., while remaining two-third will be utilized by the students in developing their skills through the hands-on exercises. The exercises to be undertaken for this purpose shall be of different nature than that of their regular laboratory / practical courses. There shall be two such skill enhancement courses, one each in semester V and VI, which shall be selected by the students depending on their choice and inclination. Performance of the students in these couses shall be assessed at the end of the semester VI following annual pattern by a pair of external examiners along with their practical courses. Students have freedom to choose the Skill Enhancement Courses (SEC III and IV) from either of their optional paper at B. Sc. Third Year.

4. **Laboratory/Practical Courses**: Every students studying in B Sc final year (Semester V and VI) is required to complete two laboratory / practical courses (Paper Nos. P-XVI and P-XVII), which shall be assessed / examined at the end of the Semester-VI (annual pattern). Paper P-XVI comprises practicals based on the compulsory (DSC) papers P-XII and P-XIV, while P-XVII comprises those based on the elective (DSE) papers P-XIII and P-XV.

The B. Sc. Third Year (Semester V and VI) Physics syllabus given in this document has been prepared by different subcommittees constituted in the meeting of the BOS in Physics held on 10th April 2018 and is finalized after due consent from all the respected members. The BOS has invited comments, suggestion, corrections in the draft syllabus from all the Physics teachers affiliated to this university and has incorported those suggestions in the syllabus presented in this document.

(***Prof. M. K. Patil***)
Chairman, Board of Studies in Physics

Structure and Marking Scheme of B. Sc. Physics Programme

B. Sc. Physics F. Y. (CBCS) Course Structure and Marking Scheme

Semester	Paper No.	Name of the Course	Contact		Assessment Scheme			Credits
			Lect/wk (L+T)	Total Hrs	MSA	ESA	Total Mark	
I	CCP I (Section A)	Mechanics and Properties of Matter (P-I)	03	45	10	40	50	2
	CCP I (Section B)	Mathematical Methods in Physics (P-II)	03	45	10	40	50	2
II	CCP II (Section A)	Heat and Thermodynamics (P-III)	03	45	10	40	50	2
	CCP II (Section B)	Electricity and Magnetism (P-IV)	03	45	10	40	50	2
Practical Paper	CCP P I (Annual Pattern)	P-V :Practicals based on Section A &B of CCP-I& II	04	60	20	80	100	4
	Total Credits of Semester I and II							12

B. Sc. Physics S. Y. (CBCS) Course Structure and Marking Scheme

Semester	Paper No.	Name of the Course	Contact		Assessment Scheme			Credits
			Lect/wk (L+T)	Total Hrs	MSA	ESA	Total Mark	
III	CCP III (Section A)	Waves and Oscillations (P-VI)	03	45	10	40	50	2
	CCP III (Section B)	Statistical Physics, Electromagnetics and Theory of Relativity (P-VII)	03	45	10	40	50	2
	CCPS I (Section A)	Skill Enhancement Course I (SEC I)	03	45	25	25	50	2
IV	CCP IV (Section A)	Optics and Lasers (P-VIII)	03	45	10	40	50	2
	CCP IV (Section B)	Basic Electronics (P-IX)	03	45	10	40	50	2
	CCPS I (Section B)	Skill Enhancement Course II (SEC II)	03	45	25	25	50	2
Practical Papers (Annual Pattern)	CCPP II (Annual Pattern)	P-X :Practicals based on Section A of CCP-III & IV	03	45	10	40	50	2
	CCPP III (Annual Pattern)	P-XI :Practicals based on Section B of CCP-III & IV	03	45	10	40	50	2
	Total Credits of Semester III and IV							16

MSA - Mid Semester Assessment
ESA – End Semester Assessment
CCP – Core Course Physics
CCPP – Core Course Physics Practical

A. Digital and Communication Electronics

***Credits:* 02**	***Periods*: 45**	***Total Marks:* 50 (*CA=10, ESE=40*)**

Learning Objectives: *This course enabels the students to understand the importance and interconvertibility of various number systems, principles of digital gates, and working principle of communication systems. After completing this course students will be in a position to know the working of communication systems i.e., modulators, demodulators, transmitters and receivers, etc.*

Unit I Number Systems (12 Periods)

Number System:- Decimal numbers, Binary numbers, Binary arithmetic, Ones complement representation, Twos complement representation, Octal Numbers, Hexadecimal numbers, Inter-conversions of number systems, Binary coded decimal (BCD), Gray code, Excess-3 code.

Unit II Logic Gates (12 Periods)

AND gate, OR gate, NOT gate, NAND gate, NOR gate, EX-OR and EX-NOR gates, Universal properties of NAND and NOR gates.

Boolean operations, logic expressions for 2,3 & 4 inputs, laws of Boolean algebra, De -Morgen's theorems, SOP form of Boolean expressions, simplification of Boolean expressions using K- maps (up to 4 variables),Half adder, Full adder

Unit III Modulation and Demodulation (12 Periods)

Introduction, Types of Modulation, Expression for A. M. voltage, AM waves, Frequency spectrum of AM wave, Power Output in AM, Expression for frequency modulated voltage, Principle of demodulation, linear diode AM detector or demodulator.

Unit IV Communication Electronics: (book5, 6) (09Periods)

Introduction, Block diagram of basic communication system, Essential elements of A.M. Transmitter. A.M. receiver: Turned Radio Frequency (TRF) Receiver, Super heterodyne receiver, Characteristics of radio receivers: sensitivity, selectivity, fidelity & their measurements.

Books Recommended:

1.Modern Digital Electronics- R.P. Jain, Tata McGraw Hill Pub. Company (Third edition)
2.Digital Fundamentals-Thomas L. Floyd, Universal Book Stall
3.Digital Principles and Applications- A. P. Malvino, (McGraw Hill International Editions(Fourth Edition)
4.Digital Electronics with Practical Approach- G. N. Shinde, Shivani Pub., Nanded
5.Electronics and Radio Engineering – M. L. Gupta
6.Communication Engineering – J.S. Katre (Tech Max Pub – Second revi. edition)

P-XV C - DSEP II (Section B) - Disciplne Specific Elective