॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with'B++' grade

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प्रस्तुत विद्यापीठीय संकुलातील व संलग्नित महाविद्यालयातील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील द्वितीय/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, **दिनांक २१ सप्टेंबर २०२१ रोजी संपन्न झालेल्या ५२ व्या मा. विद्या परिषद बैठकीतील विषय क्र. ३६/५२–२०२१** च्या ठरावानुसार **प्रस्तुत विद्यापीठीय संकुलातील व संलग्नित महाविद्यालयातील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील द्वितीय/तृतीय वर्षाच्या, C.B.C.S. (Choice Based Credit System) Pattern** नुसारच्या खालील विषयाच्या अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

01. M.Sc. Computer Science II year (Campus & Sub-centre)
02. M.Sc. Computer Application II year (Campus School)
03. MCA (2 year Programmer) II year (III Semester Campus & Affiliated Coll.)
04. MCA (3 year Programmer) III year (Campus & Affiliated Coll.)

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.

जा.क्र.: शैक्षणिक–१/परिपत्रक/पी.जी.–सीबीसीएस अभ्यासक्रम/२०२१–२२/**१५७**

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

दिनांक :०७.१०.२०२१

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. संचालक/प्राचार्य सर्व संबंधित संकुले व महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) अधीक्षक, विज्ञान विद्याशाखा परीक्षा विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळविण्यात येते की, सदरील परिपत्रकासह अभ्यासक्रम विद्यापीठ संकेतस्थळावर प्रसिध्द करावेत.

Swami Ramanand Teerth Marathwada University, Nanded

(NAAC Re-accredited with 'A' Grade)

Syllabus of Second Year

M.Sc. (Computer Application) (Campus)

(2 years) (Revised CBCS pattern)

To be introduced from Academic Year 2021-2022

Program code: SCS-S-MSCA-PG (13-2-1-01)

(BoS deserves the rights for minor corrections, typographical errors in this syllabus with due approval of Administrations)

M.Sc. Computer Application (Campus)

M.Sc. Computer Application (2years) program / degree is a specialized program in latest advances in computer application issues. It builds the student on higher studies and research awareness in overall computational application fields so as to become competent in the current race and development of new computational sciences. The duration of the study is of four semesters, which is normally completed in two years.

CBCS pattern : The M.Sc. Computer Application program as per CBCS (Choice based credit system) pattern, in which choices are given to the students under open electives and subject electives. The students can choose open electives from the wide range of options to them.

Eligibility and Fees

The eligibility of a candidate to take admission to **M.Sc. Computer Application program** is as per the eligibility criteria fixed by the University. More details on admission procedure and fee structure can be seen from the prospectus of the college / institution as well as on website of the University.

Credit Pattern

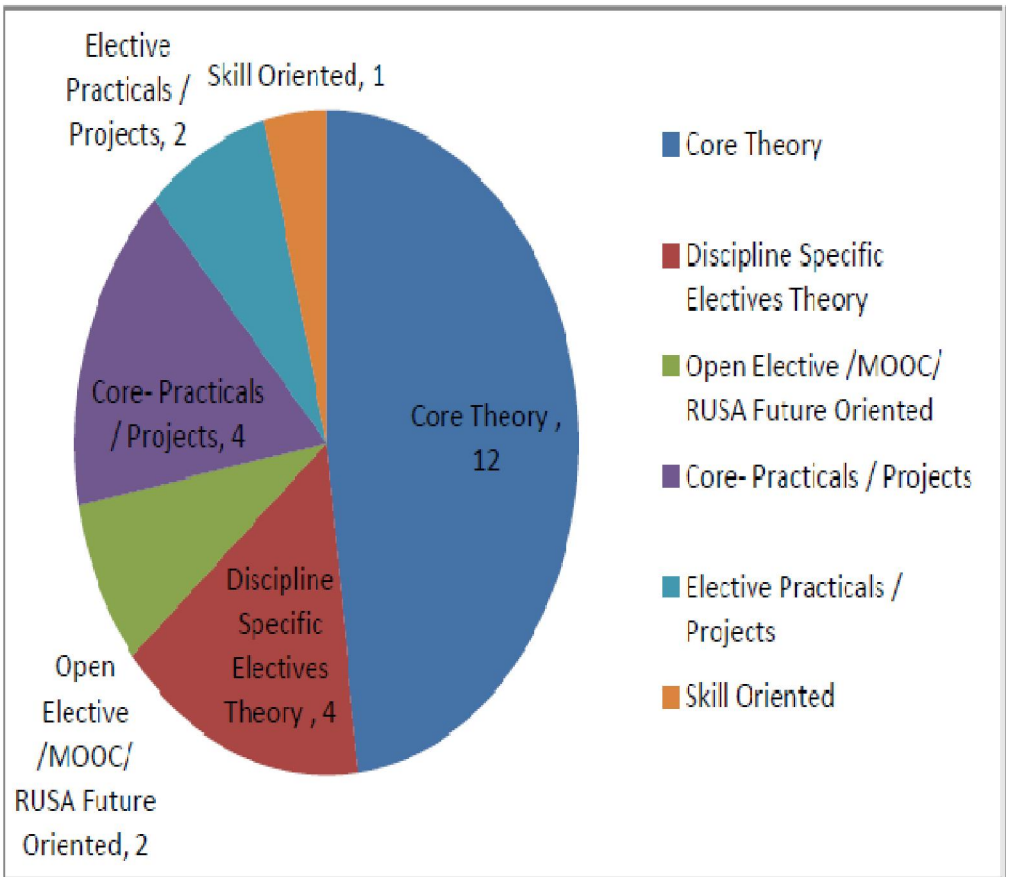
Every course has corresponding grades marked in the syllabus structure. There are 25 credits per semester. A total of 100 credits are essential to complete this program successfully. The Grading pattern to evaluate the performance of a student is as per the University rules. Every semester has a combination of Theory (core or elective) courses and Lab courses. Each theory course has 04 credits which are split as 02 external credits and 02 internal credits. The university shall conduct the end semester examination for 02 external credits. For theory internal credits, student has to appear for 02 class test (15 marks) and 01 assignment (20 marks). Every lab course has 02 credits which are split as 01 external credit and 01 internal credit. For lab internal credit, the student has to submit Laboratory Book (05 marks) and remaining 20 marks are for the Lab activities carried out by the student throughout the semester. For lab external credit, 20 marks are reserved for the examinational experiment and 05 marks are for the oral / viva examinations. There is a special skill based activity of 01 internal credits per semester which shall inculcate awareness regarding the domain of computers, IT, and ICT.

The open elective has 02 credits which are split as 01 external credit and 01 internal credit. Students are encouraged to opt for online courses / MOOCs /etc. The credit transfer shall be done as per the University policy. If students are opting for MOOCs as open elective, then, there must be a Faculty designed as MOOCs course coordinator who shall supervise learning through MOOCS. This is intentionally needed as the MOOCs course coordinator shall verify the MOOC details including its duration, staring date, ending date, syllabus contents, mode of conduction, infrastructure feasibility, and financial feasibility during start of each semester. This is precautionary as the offering of the MOOCs through online platforms are time specific and there must be proper synchronization of semester duration with the MOOCs duration. Students must opt for either institutional / departmental/school level open elective or a course from University recognized MOOCs platforms as open electives.

The number of hours needed for completion of theory and practical courses as well as the passing rules, grading patterns, question paper pattern, number of students in practical batches, etc shall be as per the recommendations, norms, guidelines and policies of the UGC, State Government and the SRTM University currently operational. The course structure is supplemented with split up in units and minimum numbers of hours needed for completion of the course, wherever possible. The new Question paper pattern as per the suggestion of Hon'ble Vice Chancellor sir which will be communicated later after due approval. Under the CBCS pattern, students would graduate **M.Sc. Computer Application** with a minimum number of required credits which includes compulsory credits from core courses, open electives and program specific elective course. All students have to undergo lab / practical activities leading to specific credits and project development activity as a part of professional PG program. The M.Sc. Computer Application Degree / program would be of 100 Credits and total credits per semester are 25. As per the guidelines, One Credit = 25 marks, Two Credits = 50 Marks, Four Credits = 100 Marks. Minimum four hours teaching per week is compulsory for 04 credit course and likewise for other variations in the credits. There must be minimum 60 lectures per semester for a theory course.

Credit Distribution per Semester:

Sr. No.	Category of courses	Credits
1	Core Theory	12
2	Discipline Specific Electives Theory	04
3	Open Elective /MOOC/ RUSA Future Oriented	02
4	Core- Practicals / Projects	04
5	Elective Practicals / Projects	02
6	Skill Oriented	01
	Total Credits per Semester	25



PEO, PO and CO Mappings

1. **Program Name** : M.Sc.(CA) Campus { SCS-S-MSCA-PG (13-2-1-01)}

2. **Program Educational Objectives**: After completion of this program, the graduates / students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in computational science based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

1. **Program Outcome(s):** Students / graduates will be able to
   PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.
   PO2: Generate solutions by understanding underlying computer application environment
   PO3: Design component, or processes to meet the needs within realistic constraints.
   PO4: Identify, formulate, and solve problems using computational temperaments.
   PO5: Comprehend professional and ethical responsibility in computing profession.
   PO6: Express effective communication skills.
   PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.
   PO8: Actual hands on technology to understand it's working.
   PO9: Knowledge of contemporary issues and emerging developments in computing profession.
   PO10: Utilize the techniques, skills and modern tools, for actual development process
   PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work
   PO12: Research insights and conduct research in computing environment.

2. **Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

3. **Mapping of PEO& PO and CO**

Program Educational Objectives	**Thrust Area**	**Program Outcome**	**Course Outcome**
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

The detailed syllabus is as below,

S. Y. M.Sc.(CA) Campus { SCS-S-MSCA-PG (13-2-1-01)}

w.e.f Academic year 2021-2022

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Third Semester						
1.	**Core Subjects**	CCA-301	Software Engineering & Testing	2	2	4
2		CCA-302	Data warehouses and Data Mining	2	2	4
3		CCA-303	Network Security	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	CCA-304 A	Mobile Application Development	2	2	4
		CCA-304 B	Web Technologies			
Practical /Lab						
5	**Lab / Practical**	CCA-305	Lab 7: Software Engineering & Testing	1	1	2
		CCA-306	Lab 8: Data warehouses and Data Mining	1	1	2
		CCA-307	Lab 9: Based on Elective	1	1	2
6	**Open Elective**	CCA-308A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR RUSA sponsored Future Oriented Courses	1	1	2
		CCA-308 B	Management Information System			
7	**Skill based Activity**	CCA-309	SK-03 : Data Mining on Local Social Issues	1	0	1
	Total credits					**25**

S. Y. M.Sc.(CA) Campus { SCS-S-MSCA-PG (13-2-1-01)}

w.e.f Academic year 2021-2022

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Fourth Semester						
1.	**Core Subjects**	CCA-401	Advanced Database Management System	2	2	4
2		CCA-402	Internet of Things	2	2	4
3		CCA-403	Theory of Computation	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	CCA-404 A	Big Data Analytics	2	2	4
		CCA-404 B	Introduction to Data Science			
Practical /Lab						
5	**Lab / Practical**	CCA-405	Lab 10: ADBMS	1	1	2
		CCA-406	Lab 11: Based on Elective	1	1	2
		CCA-407	Lab 12: Major Project Development Activity	1	1	2
6	**Open Elective**	CCA-408A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR RUSA sponsored Future Oriented Courses	1	1	2
		CCA-408 B	Introduction to LaTex			
7	**Skill based Activity**	CCA-409	SK-04 : FOSS	1	0	1
	Total credits					**25**