

# BACHELOR OF SCIENCE

## B.Sc(Mathematics, Physics, Chemistry)

### Programme Project Report (PPR)

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**CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)**

**SRI VENKATESWARA UNIVERSITY**

Accredited by "NAAC" with A<sup>+</sup> Grade

Tirupati – 517 502, Andhra Pradesh

[www.svucdoe.ac.in](http://www.svucdoe.ac.in)

  
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**PROGRAMME PROJECT REPORT (PPR)**  
**B.Sc - Mathematics, Physics, Chemistry**

**1. Programme's mission and objectives:**

Sri Venkateswara University implemented a choice-based credit system in the academic year 2015-16. In line with the NEP-2020, the university introduced a four-year undergraduate honours program starting in 2023-24.

This redesign was prompted by the University Grants Commission's (UGC) release of guidelines for a new student-centric curriculum framework called the "Curriculum and Credit Framework for Undergraduate Programmes" (CCFUP). The CCFUP emphasizes a flexible choice-based credit system, a multidisciplinary approach, and multi-entry and exit options. These features empower students to pursue their desired career paths by selecting subjects or fields that align with their interests.

Sri Venkateswara University Centre for Distance and Online Education (CDOE) offers a wide range of high-quality Open Distance Learning (ODL) programs to students pursuing higher education.

**Mission**

The Centre for Distance and Online Education (CDOE) is committed to excellence in higher education. We achieve this by:

- Our programmes are designed to be well-developed, convenient, and competitively priced, allowing learners to contribute to their own growth and the betterment of society.
- We provide opportunities to those who cannot attend traditional programs at affiliated colleges. Our focus is on reaching students in rural and remote .
- We view distance education as a solution for those facing challenges with access, infrastructure, or socioeconomic factors.

**Objectives:**

- We introduce students to the vast possibilities within higher education, igniting their academic curiosity.
- We offer a cost-effective and resource-rich educational experience through distance learning methods.

We strive to make education accessible to all qualified and motivated individuals.

- We foster a love of learning and encourage students to continuously expand their knowledge.
- We aim to raise the overall enrollment rate in higher education.

**2. Relevance of the program with HEI's Mission and Goals:**

Sri Venkateswara University strives to be India's leading university, renowned for excellence in teaching, research, and providing top-tier educational opportunities for a diverse student body. The University fosters intellectual growth, nurturing students to become well-rounded global citizens who are:

- Multi-skilled
- Socially responsible
- Creative
- Adaptable
- Contributing members of society
- Morally sound

We provide opportunities and support to students from all backgrounds, helping them develop their full intellectual, moral, civic, and creative potential. Through multifaceted education and engagement with local, national, and global communities, we empower students to become informed global citizens.

The University fosters excellence through active and dynamic student-teacher participation in the academic process. We instill high moral, ethical, and professional standards, equipping students with the knowledge and skills needed to achieve their professional goals, improve performance, and serve as leaders and role models within their communities.

### 3. Nature of prospective target group of learners

- Students who have dropped out of their studies
- Women seeking higher education
- Unemployed youth seeking to upskill
- Working professionals looking to advance their careers
- Defense personnel
- Primary school teachers pursuing professional development

These groups share a common desire for higher education but may face social or economic barriers to attending regular programs. Our curriculum is specifically designed to address the academic needs of this diverse audience.

#### 1. Preamble:

Choice Based Credit System (CBCS) was introduced, under the aegis of Andhra Pradesh State Council of Higher Education (APSCHE), at the insistence of the University Grants Commission, for the general undergraduate programmes, i.e., BA, B.Com, BSc, BCA, BBA, UG Honours etc., by the affiliating universities in all government, aided and private degree colleges in the state of Andhra Pradesh in 2015 - 2016.

The system of CBCS has been in vogue for the undergraduate programmes in all the advanced countries for several decades and proved to be advantageous to the students of higher education because of its features like courses in place of papers, availability of diverse courses, scope for choice, weightages with credits, space for multiple kinds of teaching, learning and assessing methods which can effectively cater to the diverse needs of students.

As the existing CBCS would be completing five years by 2019-20, the APSCHE decided to revise and strengthen the scheme while addressing the following issues.

- a. Overcoming the shortages in the existing system.
- b. Consolidating the system in its true spirit by providing multiple choices in domain as well as general courses.
- c. Revising the curricular framework wherever needed.
- d. Orienting syllabus to the course outcomes as advised by UGC

- e. Updating of syllabus to match to the present needs
- f. Replacing papers with courses
- g. Introducing better skill-oriented courses to align with the emerging and employment areas.

For carrying out the above task, the APSCHE constituted a Committee for recommending revised curricular framework and updated syllabus of UG Programmes, i.e., B.A., B.Com., B.Sc., BCA, BBA, UG Honours etc., under CBCS pattern from the year 2020-21.

Based on the recommendations of the Committee, the following Guidelines are formulated. These Guidelines of Curricular Framework with revised Choice Based Credit System comes into effect from the academic year 2020 – 2021, to be strictly adhered for all Undergraduate Programmes offered in Affiliated Colleges and Autonomous Colleges.

1. The Curricular Framework for UG – Arts; UG – Science and UG – Commerce are appended as Annexures–I, II & III respectively.
2. **Life Skill Courses:** There will be 4 Life Skill Courses in place of earlier 10 foundation courses with the same hours, credits and maximum marks. The objective is to inculcate the required simple life-long skills. While the course in ‘Environmental Education’ continued to be mandatory, in case of others, students can opt one out of three courses, unlike in the existing system, where no choice is being given to students.
3. **Skill Development Courses:** A new set of 4 Skill Development Courses will be offered with 2 hours of teaching per week, two credits, 50 maximum marks and only external assessment. These courses are intended to train students in broad-based multiple career oriented general skills, in Arts, Commerce and Science streams but open to all students. A wider choice is given to students as they can choose one course from a total of six courses(two from each stream).
4. The preferred departments for teaching LSCs and SDCs are appended.
5. To ensure accountability among the teachers teaching LSCs and SDCs courses, the workload of these is to be reckoned for the calculation of workload of teachers.
6. **Core Courses:** Three core courses of Domain subjects will be in the first three semesters,

and the fourth and fifth courses will be in the fourth semester. Two domain SECs will be in the fifth semester. There will be uniformly five Core Courses in each Domain Subject in BA and BSc, and 15 in B.Com.

7. **Skill Enhancement Courses:** Two Skill Enhancement Courses will be offered for each domain subject, in Semester V. The two Skill Enhancement Courses of each domain subject will be linked for a wider basic and practical experience to students.
8. Programmes like BCA, BBA, UG Honours etc. will broadly have a similar framework as prescribed for B.Com considering them as single major subject programme.
9. Table-1: Main Features of the Courses in the Revised Curricular Framework.

Subject/Course	Hours / Week Theory	Hours / Week Practicals	Total Hours	Credits	Max Marks Internal Assessment	Max Marks University Exam	Total
Life Skills Course	02	-	02	02	-0-	50	50
Skill Development Course	02	-	02	02	-0-	50	50
Language Subject	04	-	04	03	25	75	100
Domain Arts/Commerce Subject	05	-	05	04	25	75	100
Domain Science Subject	04	02	05	05 (4+1)	25	75	100
Mathematics	06	-	06	05	25	75	100

10. The four courses of LSCs, SDCs and three courses of Languages (as they exist now) will be offered in the first three semesters as shown in the table below. The detailed structure is shown in Tabel-2 below.

<i>Courses of</i>	<i>Sem-I</i>	<i>Sem-II</i>	<i>Sem-III</i>	<i>Sem-IV</i>	<i>Sem-V</i>
Life Skills	1 (02)	1 (02)	2 (04)		
Skill Development	1 (02)	2 (04)	1 (02)		
Language – 1	C-1 (04)	C-2 (04)	C-3 (04)		
Language – 2	C-1 (04)	C-2 (04)	C-3 (04)		
Domain Sub -1	C-1 (06)	C-2 (06)	C-3 (06)	C-4 (06) C-5 (06)	SEC-1(06) SEC-2 (06)
Domain Sub -2	C-1 (06)	C-2 (06)	C-3 (06)	C-4 (06) C-5 (06)	SEC-1(06) SEC-2 (06)
Domain Sub -3	C-1 (06)	C-2 (06)	C-3 (06)	C-4 (06) C-5 (06)	SEC-1(06) SEC-2 (06)
Total Hours/Week	30	32	32	36	36

\* Figures in parenthesis are hours per week of Core Courses of Science. In respect of Arts and Commerce Courses, the hours per week for Core Courses will be 5.

\*\* SEC1 and SEC-2 in Sem-V are C-6 and C-7 respectively.

11. Teaching of two appropriate LSCs/SDCs are to be assigned to the language departments to mitigate the workload shortage for the language subjects, as being done in respect of Foundation Courses in the previous system. The workload for teaching LSCs and SDCs by the respective language department shall be reckoned while calculating their workload.
12. The syllabus was revised and updated keeping the Learning Outcomes in view for ensuring higher order learning and skills, a requirement in higher education. The Universities and colleges shall make certain that teaching, learning and assessment are outcome oriented.
13. In the affiliation system which imposes limitations in assessing students, the internal assessment is crucial in ensuring the right learning. Universities and colleges may strengthen the internal assessment without disturbing its flexibility.
14. Co-curricular activities play an important role in promoting experiential self-learning and field-based learning in students, especially in learning higher order skills. The measurable pedagogical activities can be a small part of internal assessment.

15. The respective Boards of Studies of the affiliating universities/autonomous colleges may modify the syllabus prepared by the subject committees as mentioned above to a limited extent, without disturbing the Frame work recommended above.
16. In view of the advantages of using ICT in teaching and learning, the universities and colleges may offer 'online courses' on extra credits. They may take into consideration the standardized online courses offered by various government/public agencies and also may design their own new online courses following due procedures.
17. Similarly, online programmes such as Webinars, with greater participation of students, may be encouraged in colleges.
18. The system of credit transfer facilitates students getting better training at appropriate places. The universities may discuss and develop a uniform system and guidelines in this regard across the state. The number of credits earned under credit transfer shall, however, be limited to a small number. APSCHE will issue separate guidelines.
19. To ensure inculcating social responsibility and compassionate commitment among the students, the summer vacation in the intervening 1<sup>st</sup> and 2<sup>nd</sup> years of study shall be for Community Service. Detailed guidelines on the Community Service will be circulated shortly.
20. To make the students employable, an Apprenticeship / Internship / On the job training shall be undertaken by the students in the intervening summer vacation between the 2<sup>nd</sup> and 3<sup>rd</sup> years.
21. During the entire 6<sup>th</sup> Semester, the student shall undergo Apprenticeship / Internship / On the Job Training. This is to ensure that the students develop hands on technical skills which will be of great help in facing the world of work.

  
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22. APSCHE shall issue guidelines for the implementation and assessment of the Apprenticeship / Internship / On the job Training.

### LIST OF LIFE SKILL COURSES

Semester	No. of Courses	Choices	Preferred Teaching Dept.
<b>I</b>	<b>01</b>	Computer Applications	Computers
		Human Values and Professional Ethics	English/Telugu/Any Dept
		Entrepreneurship	Commerce
<b>II</b>	<b>01</b>	Information and Communication Technology	Computers
		Indian Culture and Science	History/Telugu
		Elementary Statistics	Statistics/Maths/Economics/Commerce
<b>III</b>	<b>02</b>	Health and Hygiene	Zoology/Botany
		Personality Development and Leadership	English/ Any Dept
		Analytical Skills	Maths/Statistics
		Environmental Education	Botany/Zoology/Environmental Sciences/Any Dept.

**List of Skill Development Courses along with their Semester-wise allotment with choices.  
Preferred Teaching Departments are given in the parenthesis.**

Sem	No. of Courses	Stream – A (Arts)	Stream – B (Commerce)	Stream – C (Science)
<b>I</b>	<b>01</b>	Tourism Guidance (History)  Public Relations (Pol Sci/English)	Secretaryship  Insurance Promotion	Electrical Appliances (Physics)  Plant Nursery (Botany)
<b>II</b>	<b>02</b>	Journalistic Reporting (English)  Survey & Reporting (Economics/History)  Social Work Methods (Pol Sci)  Performing Arts (Telugu)	Agricultural Marketing  Business Communication (English)  Advertising  Logistics & Supply Chain	Solar Energy (Physics)  Fruit & Vegetable Preservation (Botany)  Dairy Techniques (Zoology)  Food Adulteration (Chemistry)
<b>III</b>	<b>01</b>	Financial Markets (Economics)  Disaster Management (English/Telugu)	Online Business  Retailing	Environment Audit (Chemistry)  Poultry Farming (Zoology)

Framework and Guidelines for Preparing Syllabus for V Semester Skill Enhancement Courses (SECs)

  
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**A. FRAMEWORK****I. Framework for B.Sc**

1. A total of 6 Skill Enhancement Courses (SECs) will be offered in Semester V, two from each of the Major Domain Subjects in a programme. For example, BA-HEP will have two SECs each for History, Economics and Political Science. BSc MPC will have two SECs each for Mathematics, Physics and Chemistry.
2. The two SECs will be Course-6 and Course-7 (Courses 1 to 5 of each domain subject will be offered as core courses from semesters 1 to 4) of the respective domain subjects.
3. The two SECs can be linearly linked or related to each other, as far as possible (*for example, (SEC-1) Tourism and (SEC-2) Archeology OR (SEC-1) Analytical Methods in Chemistry and (SEC-2) Environmental Chemistry*). This is (a) to give students a wider experience in the same/related area and (b) to avoid too many skills areas (already the student is pursuing 3 different domain subjects HEP or MPC)
4. The two SECs can be termed as one 'pair' of courses for each domain subject.
5. Since the SECs are Electives under CBCS, at least three 'pairs' are to be offered by the institution to the students from which 'one pair' will be chosen by students.
6. The minimum total SEC 'pairs' offered for three domain subjects will be 9 (3x3 pairs i.e., 18 courses) for a BA/B.Sc Programme, of which a student chooses one pair for each domain subject.
7. More than three pairs can also be offered enhancing the selection range to students.

**II. Hours, Credits and Marks for B.Sc :**

The details of hours, credits and marks for B.Sc are as shown below.

Table: B.Sc. Programme:

Sem	Domain Sub	Course	Hours/wk Theo+Pra	Credits	Max Marks	Remarks	
V	1 (ex. Botany)	Course – 6	3+3	3+2	100 +50		
		Course – 7	3+3	3+2	100 +50		
	2	Course – 6	3+3	3+2	100 +50		
		Course – 7	3+3	3+2	100 +50		
	3	(ex. Zoology)	Course – 6	3+3	3+2	100 +50	
			Course – 7	3+3	3+2	100 +50	
3	(ex. Chemistry)	Course – 6	3+3	3+2	100 +50		
		Course – 7	3+3	3+2	100 +50		

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### III. The Format:

The overall format for the curriculum of SECs will be more or less the same as Core Courses 1 to 5, and as shown below.

1. **Title** of the Course along with other details, total hours, maximum marks etc.
2. **Outcomes:** Not more than five. Shall focus on skills outcomes along with knowledge outcomes. There is no need for writing 'Objectives' of the SEC.

(Outcomes are different from objectives and are usually written as possible future attainments. For example, outcomes in Economics can be written like this.

*At the end of the course the student will be able to;*

- i. *Analyse the annual budget of the country/state.*
- ii. *Prepare a real time budget document .....*)

3. **Syllabus Content:** Will consist of Five units. Unlike the Core Courses, SEC syllabus content will be more oriented towards learning of field related skills rather than mere knowledge content by students. The skills to be learnt by students shall match with 'Outcomes' mentioned.
4. **Hours:** Total classroom/lab/field hours for each course: 90 in Science (incl. Maths) and 75 in Arts/Commerce.
  - a. Science subjects: The total 90 hours include 80 hours of theory and practical classes in classroom and lab, 10 hours for imparting field related skills in the lab/field and 05 hours for training in the field by the teacher. The remaining 05 hrs are for other activities including unit tests.
  - b. Arts and Commerce subjects: 65 hours for teaching and other activities including tests etc. and 10 hours for training in the actual field related skills in the classroom/field by the teacher.

5. ~~Maximum Marks:~~ Maximum marks for a SEC in arts/commerce are 100 (incl IE). For a SEC in science: 150 (theory, incl IE:100 and Practical: 50) as in core courses

6. **References:** List of textbooks/practical/field manuals/reference books and web sites.

7. **Co-curricular activities:** Mandatory and Suggested.

a) **Mandatory:**

1. As suggested above teacher shall impart actual field related skills to students for 15 hours in Science and 10 hours in Arts/Commerce subjects in the classroom/lab/field. A list of suggested skills (based on the syllabus of the course) to be taught to students in the classroom/lab/field may be recommended under this title. The skills suggested may be related to the outside field/agency/lab/industry concerned.
2. Field work will be mandatory for students of both science and arts/commerce domains for learning/practicing skills (this is in addition to the laboratory work and record in case of science subjects). The curriculum document may suggest some areas of field work related to the SEC.
3. Each student has to submit a simple, hand-written Fieldwork Report on white paper not exceeding 10 pages as an evidence of his/her work in the field. A maximum of 5 marks may be allotted for this report from the Internal Assessment quota.
4. A format for the Fieldwork Report may be suggested for the SEC.

b) **Suggested Co-curricular activities:** a few co-curricular activities like assignments, seminars, invited lectures, group discussion, quiz, compilation of information including model documents, photographs of tools/equipment, visits, preparation of videos etc. may be suggested under this title.

B. **GUIDELINES**

1. SECs are different from Core Courses as well as SDCs. SDCs are introductory courses for general skills whereas SECs belong to the Domain Subject Concerned. The scope of SDC is small (2 hrs and 2 credits) while the scope of SEC is larger (5hrs and 4 credits for arts/commerce and 6hrs and 5 credits for science).
2. Curricula for SECs are to be prepared keeping in mind the students of urban, rural and remote areas including slow learners. The intention is to inculcate skills related to the domain subjects that are practiced in markets, industry, agencies around the college. The college shall be able to inculcate the skill with its available resources.

3. Since the main objective of SECs is to inculcate the skills related to the areas of domain subject concerned, the curriculum has to cover aspects such as knowledge, protocols of skills and practicing of skills in classroom/lab/field.
4. It is desirable that the skills part in the syllabus may be not less than 30%.
5. The skills to be included in SECs, whether simple or advanced, shall be currently in practice in the field and available in all areas of the State. No use of including outdated skills.
6. As there will not be any separate practical examination for SECs in Arts and Commerce, the student shall answer the skills part also theoretically. Hence, terms with high technicality and complicated procedures shall be avoided.
7. The existing domain subject lecturers shall be able to teach all the skills of the SECs concerned.
8. It is desirable that the format for field work report is very simple and short so that students of remote areas will also be able to prepare and submit.
9. The fact that our arts and commerce classrooms will have large student strengths shall be kept in mind while choosing the skills for syllabus.
10. It is essential that the syllabus document is prepared in Word file with 12 Times New Roman font and in 'No Space' style. Tables copied and pasted from other files like pdf, MS power point & Excel etc. will seriously hamper correcting and editing. It is important that use of disabled tables in the syllabus document is avoided. Bolding, italicizing and colouring of sentences may be rare and for the purpose only.
11. Templates will be circulated, and the format is adhered to.
12. **Cost Estimates for the Development of The Programme:** The Programme fee for 1st year is Rs.7,000/in 2nd year 6,000/- and 3rd year Rs. 6,000/-. The university will pay the remuneration to course writers and counsellors as per university norms. Processing, Print Materials and Examination fees as prescribed by the University. It will be revised periodically to attract the counsellors. This institution is providing high-quality programmes at

13. **Library Resources:** The institution has a sizable collection of Mathematics, Physics, Chemistry books in the library on its premises. The students make use of the library.

14. **Quality Assurance Mechanism and Expected Programming Outcomes:**

- Upon successful completion of the course, the students receive a degree in Bachelor of Science (B.Sc).
- The graduates of this Programme are expected to branch out into different and possible career paths.
- On completion of the course, students are expected to have acquired specific skills and generic skills like mind management, creativity and innovation of competencies in diverse areas.
- The program learning outcomes of B.Sc. also enable a student to prepare for further study, employment and good citizenship.

  
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**B.Sc - Mathematics, Physics, Chemistry****SEMESTER – I**

Sl.No.	Course	Name of the Subject	Total Marks	Mid Sem	Sem End	Teaching Hours	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	Telugu	100	25	75	4	3
3.	Skill Skills		50	---	50	2	2
4.	Skill Development Courses		50	---	50	2	2
5.	1M	Differential Equations	100	25	75	5	4
6.	1P	Mechanics, Waves and Oscillations	100	25	75	5	4
7.	1C	Inorganic and Organic Chemistry	100	25	75	5	4
		<b>Total</b>	<b>600</b>	<b>125</b>	<b>475</b>	<b>27</b>	<b>22</b>

**B.Sc - Mathematics, Physics, Chemistry****SEMESTER – II**

Sl.No.	Course	Name of the Subject	Total Marks	Mid Sem	Sem End	Teaching Hours	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	Telugu	100	25	75	4	3
3.	Skill Skills		50	---	50	2	2
4.	Skill Development Courses -1		50	---	50	2	2
	Skill Development Courses -2		50	---	50	2	2
5.	2M	Three Dimensional Analytical Solid Geometry	100	25	75	5	4
6.	2P	Wave Optics	100	25	75	5	4
7.	2C	Physical and General Chemistry	100	25	75	5	4
		<b>Total</b>	<b>650</b>	<b>125</b>	<b>525</b>	<b>29</b>	<b>24</b>

  
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**B.Sc - Mathematics, Physics, Chemistry****SEMESTER – III**

Sl.No.	Course	Name of the Subject	Total Marks	Mid Sem	Sem End	Teaching Hours	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	Telugu	100	25	75	4	3
3.	Skill Skills - 1		50	---	50	2	2
	Skill Skills - 2		50	---	50	2	2
4.	Skill Development Courses		50	---	50	2	2
5.	3M	Abstract Algebra and Real Analysis	100	25	75	5	4
6.	3P	Electricity, Magnetism and Electronics	100	25	75	5	4
7.	3C	In-Organic, Physical, Organic Chemistry	100	25	75	5	4
		<b>Total</b>	<b>650</b>	<b>125</b>	<b>525</b>	<b>29</b>	<b>24</b>

**B.Sc - Mathematics, Physics, Chemistry****SEMESTER – IV**

Sl.No.	Course	Name of the Subject	Total Marks	Mid Sem	Sem End	Teaching Hours	Credits
1.	4M1	Linear Programming	100	25	75	5	4
2.	4M2	Mathematics - <b>Elective</b>	100	25	75	5	4
3.	4P1	Modern Physics	100	25	75	5	4
4.	4P2	Physics - <b>Elective</b>	100	25	75	5	4
5.	4C1	Chemistry & Industry	100	25	75	5	4
6.	4C2	Chemistry - <b>Elective</b>	100	25	75	5	4
		<b>Total</b>	<b>600</b>	<b>150</b>	<b>450</b>	<b>30</b>	<b>24</b>

  
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