

Program outcomes – Program Specific outcomes for all programs offered by the college

**Name of the college: Sri Vyasa NSS College, Thrissur
(Affiliated to Calicut University)**

UG PROGRAMMES

B.Sc. CHEMISTRY

With the pace that the world keeps and the speed with which technology advances, an understanding of science is inevitable in our day-to-day life. To make the study of science interesting and enjoyable, the creation of a scientific temper in society is a must which could be achieved through proper education and guidance. An effective science education can be imparted at the undergraduate level only by revamping the curriculum according to the needs and developments of the modern society from time to time. To achieve this goal, the curriculum should be restructured by giving emphasis on various aspects such as the creativity of students, knowledge of current developments in the discipline, awareness of environmental impacts due to the development of science and technology, and the skills essential for handling equipment's and instruments in laboratories and industries.

Chemistry, being an experimental science, demands testing theories through practical laboratory experiences for a thorough understanding of the subject. Nowadays, chemistry laboratories in academic institutions use large amounts of chemicals. The ever rising cost of chemicals adversely affects many of the practical exercises. The fumes, gases and wastes produced during chemical reactions pollute the environment and affect public health. The awareness and implementation of eco-friendly experiments thus becomes a global necessity.

It is in this context, that the need for greener approaches becomes more relevant. It is essential to ensure that laboratory chemicals are used at a minimal level without affecting the skill and understanding aimed through laboratory sessions. The change brought about in the present scheme makes use of micro scale techniques and double burette titrations. This has been done without any conceptual deviation from the principles of experiments. This method not only reduces the expenditure on chemicals but also creates an environmental awareness among the students and pollution free atmosphere in the campus. This scheme saves time and energy of students while performing the experiments.

AIMS

This curriculum has been prepared with the objective of giving sound knowledge and understanding of chemistry to undergraduate students. The goal of the syllabus is to make the study of chemistry stimulating, relevant and interesting. It has been prepared with a view to equip students with the potential to contribute to academic and industrial environments. This curriculum will expose students to various fields in chemistry and develop interest in related disciplines. Chemistry, being a border science to biology, physics and engineering, has a key role to play in the understanding of these disciplines. The updated syllabus is based on an interdisciplinary approach to understand the application of the subject in daily life.

BROAD OBJECTIVES

- To enable the students
- To understand basic facts and concepts in chemistry.
- To apply the principles of chemistry.
- To appreciate the achievements in chemistry and to know the role of chemistry in nature and in society.
- To familiarize with the emerging areas of chemistry and their applications in various spheres of chemical sciences and to apprise the students of its relevance in future studies.
- To develop skills in the proper handling of instruments and chemicals.
- To familiarize with the different processes used in industries and their applications.
- To develop an eco-friendly attitude by creating a sense of environmental awareness.
- To be conversant with the applications of chemistry in day-to-day life.

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PROGRAMME OUTCOMES

This curriculum has been prepared with the objective of giving sound knowledge and understanding of chemistry to undergraduate students. The goal of the syllabus is to make the study of chemistry stimulating, relevant and interesting. It has been prepared with a view to equip students with the potential to contribute to academic and industrial environments. This curriculum will expose students to various fields in chemistry and develop interest in related disciplines. Chemistry, being a border science to biology, physics and engineering, has a key role to play in the understanding of these disciplines. After completion of B.Sc degree in Chemistry, students gained the theoretical as well as experimental knowledge of handling chemicals and its application for specific purposes. The student could expand the knowledge in Science and opportunities related to chemistry in the government/ private services in the field of food safety, health inspector, pharmacist etc. The updated syllabus is based on an interdisciplinary approach to understand the application of the subject in daily life.

SEMESTER I

Course Code: CHE1B01

Core Course I: Theoretical and Inorganic Chemistry- I

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

CHE1B01	Theoretical and Inorganic Chemistry-I	L*	T**	P***	C#
		2	0	0	2
Objective (s)	To gain detailed knowledge of the principle of volumetric analysis and properties of <i>s</i> and <i>p</i> block elements. To provide the basic groundwork for a research project. Students will be able to analyse basic theory of acid base concept.				
Course outcome (s)					
CO1	To apply the methods of a research project.				
CO2	To understand the principles behind volumetry.				
CO3	To analyse the characteristics of different elements.				
CO4	To distinguish between different acid base concepts.				
CO5	To analyse the stability of different nuclei.				

*Lecture, **Tutorial, *** Practical, #Credit

SEMESTER II

Course Code: CHE2B02

Core Course II: Theoretical and Inorganic Chemistry- II

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

CHE2B02	Theoretical and Inorganic Chemistry- II	L	T	P	C
		2	0	0	2
Objective(s)	Module I – To introduce the students to the failures of classical physics theories in explaining many experiments and the emergence of quantum theory with which all of them could be satisfactorily explained. Module II – To enable the students to understand the basic postulates of quantum mechanics and how to solve the time-independent Schrödinger wave equation of different systems including H atom. Module III – To introduce the quantum mechanical treatment of chemical bonding in diatomic molecules using VB and MO theories. Module IV - To introduce the students to the quantum mechanical treatment of hybridisation and bonding in polyatomic systems.				
Course outcome (s)					
CO1	To understand the importance and the impact of quantum revolution in science.				
CO2	To understand and apply the concept that the wave functions of hydrogen atom are nothing but atomic orbitals.				
CO3	To understand that chemical bonding is the mixing of wave functions of the two combining atoms.				
CO4	To understand the concept of hybridization as linear combination of orbitals of the same atom.				
CO5	To inculcate an atomic/molecular level philosophy in the mind.				

SEMESTER III

Course Code: CHE3B03

Core Course III: PHYSICAL CHEMISTRY - I

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE3B03	PHYSICAL CHEMISTRY - I	L	T	P	C
		3	0	0	3
Objective (s)	To introduce the concepts of chemical thermodynamics, equilibria and group theory.				
Course outcome (s)					
CO1	To understand the properties of gaseous state and how it links to thermodynamic systems.				
CO2	To understand the concepts of thermodynamics and its relation to statistical thermodynamics.				
CO3	To apply symmetry operations to categorize different molecules.				

SEMESTER IV

Course Code: CHE4B04

Core Course IV: ORGANIC CHEMISTRY-I

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE4B04	ORGANIC CHEMISTRY-I	L	T	P	C
		3	0	0	3
Objective (s)	To enable the students to analyse basic theory and concepts of organic chemistry and appreciate different organic reaction mechanism and their stereochemistry.				
Course outcome (s)					
CO1	To apply the concept of stereochemistry to different compounds.				
CO2	To understand the basic concepts of reaction mechanism.				
CO3	To analyse the mechanism of a chemical reaction.				
CO4	To analyse the stability of different aromatic systems.				

SEMESTER IV

Course Code: CHE4B05(P)

Core Course V: INORGANIC CHEMISTRY PRACTICAL - I

Total Hours: 128; Credits: 4; Hours/Week: 2 (I, II, III & IV Semesters); Total Marks 100
(Internal 20 & External 80)

CHE4B05 (P)	INORGANIC CHEMISTRY PRACTICAL - I	L	T	P	C
		0	0	2	4
Objective (s)	To enable the students to gain skills in preparation of standard solutions and quantitative volumetric analysis.				
Course outcome (s)					
CO1	To enable the students to develop skills in quantitative analysis and preparing inorganic complexes.				
CO2	To understand the principles behind quantitative analysis.				
CO3	To apply appropriate techniques of volumetric quantitative analysis in estimations.				
CO4	To analyse the strength of different solutions.				

SEMESTER V

Course Code: CHE5B06

Core Course VI: INORGANIC CHEMISTRY – III

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE5B06	INORGANIC CHEMISTRY – III	L	T	P	C
		3	0	0	3
Objective (s)	To enable the students to gain detailed knowledge of the chemistry of different analytical principles and to develop concerns for environment. To give a basic understanding of different metallurgical processes, interhalogen compounds and inorganic polymers.				
Course outcome (s)					
CO1	To understand the principles behind qualitative and quantitative analysis.				
CO2	To understand basic processes of metallurgy and to analyse the merits of different alloys.				
CO3	To understand the applications of different inorganic polymers.				
CO4	To analyse different polluting agents.				
CO5	To apply the principles of solid waste management.				

SEMESTER V

Course Code: CHE5B07

Core Course VII: ORGANIC CHEMISTRY – II

Total Hours: 64; Credits: 3; Hours/Week: 4; Total Marks 75 (Internal 15 & External 60)

CHE5B07	ORGANIC CHEMISTRY – II	L	T	P	C
		4	0	0	3
Objective (s)	To give the students a thorough knowledge about the chemistry of selected functional groups and their applications in organic preparations.				
Course outcome (s)					
CO1	To understand the difference between alcohols and phenols.				
CO2	To understand the importance of ethers and epoxides.				
CO3	To apply organometallic compounds in the preparation of different functional groups.				
CO4	To apply different reagents for the inter conversion of aldehydes, carboxylic acids and acid derivatives.				
CO5	To apply active methylene compounds in organic preparations.				

SEMESTER V

Course Code: CHE5B08

Core Course VIII: PHYSICAL CHEMISTRY – II

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE5B08	PHYSICAL CHEMISTRY – II	L	T	P	C
		3	0	0	3
Objective (s)	To familiarise the students with the concepts of kinetics, catalysis and photochemistry and to familiarize the applications of molecular spectroscopy and phase equilibrium.				
Course outcome (s)					
CO1	To apply the concept of kinetics, catalysis and photochemistry to various chemical and physical processes.				
CO2	To characterise different molecules using spectral methods.				
CO3	To understand various phase transitions and its applications.				

SEMESTER VI

Course Code: CHE6B09

Core Course IX: INORGANIC CHEMISTRY – IV

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE6B09	INORGANIC CHEMISTRY – IV	L	T	P	C
		3	0	0	3
Objective (s)	To gain detailed knowledge of the electronic configuration and properties of transition and inner transition elements and their role in biological systems. To introduce the importance of different instruments used in analysis.				
Course outcome (s)					
CO1	To understand the principles behind different instrumental methods.				
CO2	To distinguish between lanthanides and actinides.				
CO3	To appreciate the importance of CFT.				
CO4	To understand the importance of metals in living systems.				
CO5	To distinguish geometries of coordination compounds.				

SEMESTER VI

Course Code: CHE6B10

Core Course X: ORGANIC CHEMISTRY – III

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE6B10	ORGANIC CHEMISTRY – III	L	T	P	C
		3	0	0	3
Objective(s)	To gain detailed knowledge of the chemistry of different bio molecules. To provide a basic understanding of different spectral techniques and their application in simple molecules. To differentiate diverse pericyclic reactions.				
Course outcome (s)					
CO1	To elucidate the structure of simple organic compounds using spectral techniques.				
CO2	To understand the basic structure and tests for carbohydrates.				
CO3	To understand the basic components and importance of DNA.				
CO4	To understand the basic structure and applications of alkaloids and terpenes.				
CO5	To distinguish different pericyclic reactions.				

SEMESTER VI

Course Code: CHE6B11

Core Course XI: PHYSICAL CHEMISTRY – III

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE6B11	PHYSICAL CHEMISTRY – III	L	T	P	C
		3	0	0	3
Objective (s)	To get a thorough knowledge of electrochemistry, colligative properties and solid state.				
Course outcome (s)					
CO1	To understand the basic concepts of electrochemistry.				
CO2	To understand the importance of colligative properties.				
CO3	To relate the properties of materials/solids to the geometrical properties and chemical compositions.				

SEMESTER VI

Course Code: CHE6B12

Core Course XII: Advanced and Applied Chemistry

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE6B12	Advanced and Applied Chemistry	L	T	P	C
		3	0	0	3
Objective (s)	To initiate the students to the role and opportunities of chemistry as a discipline in modern civilization.				
Course outcome (s)					
CO1	To understand the importance of nanomaterials.				
CO2	To appreciate the importance of green approach in chemistry.				
CO3	To understand the uses and importance of computational calculations in molecular design.				
CO4	To understand the role of chemistry in human happiness index and life expectancy.				

SEMESTER VI

Course Code: CHE6B13(E2)

Core Course XIII: Elective 2. POLYMER CHEMISTRY

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE6B13(E2)	POLYMER CHEMISTRY	L	T	P	C
		3	0	0	2
Objective (s)	To gain detailed knowledge about the classification of polymers and various mechanisms and technology adopted for polymerisation. To give a basic understanding of the properties of polymers like glass transition temperature, molecular weight and degradation of polymers. To give a detailed idea about different commercial polymers.				
Course outcome (s)					
CO1	To understand various classification of polymers and types of polymerisation methods.				
CO2	To understand the important characteristics of polymers such as average molecular weight, glass transition temperature, viscoelasticity and degradation.				
CO3	To appreciate the importance of processing techniques.				
CO4	To characterise different commercial polymers and to understand the significance of recycling.				

Core Course XIV: PHYSICAL CHEMISTRY PRACTICAL

Total Hours: 80; Credits: 4; Hours/Week: 5 (Semester V); Total Marks 100 (Internal 20 & External 80)

CHE6B14(P)	PHYSICAL CHEMISTRY PRACTICAL	L	T	P	C
		0	0	5	4
Objective (s)	To familiarise the students with the relation between physical properties and chemical composition used for analysis. To provide students an idea of designing experimental methods to analyse the physical properties of molecules or materials.				
Course outcome (s)					
CO1	To enable the students to develop analytical skills in determining the physical properties (physical constants).				
CO2	To develop skill in setting up an experimental method to determine the physical properties.				
CO3	To understand the principles of Refractometry, Potentiometry and Conductometry.				

SEMESTER VI

Course Code: CHE6B15(P)

Core Course XV: ORGANIC CHEMISTRY PRACTICAL

Total Hours: 80; Credits: 4; Hours/Week: 5 (Semester V); Total Marks 100 (Internal 20 & External 80)

CHE6B15(P)	ORGANIC CHEMISTRY PRACTICAL	L	T	P	C
		0	0	5	4
Objective (s)	To empower the students to prepare different compounds without compromising yield. Characterisation and analysis of different organic compounds based on functional groups. To develop skill in separation and purification of mixtures.				
Course outcome (s)					
CO1	To enable the students to develop analytical skills in organic qualitative analysis.				
CO2	To develop talent in organic preparations to ensure maximum yield.				
CO3	To apply the concept of melting or boiling points to check the purity of compounds.				
CO4	To analyse and characterise simple organic functional groups.				
CO5	To analyse individual amino acids from a mixture using chromatography.				

SEMESTER VI

Course Code: CHE6B16(P)

Core Course XVI: INORGANIC CHEMISTRY PRACTCAL-II

Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal 20 & External 80)

CHE6B16(P)	INORGANIC CHEMISTRY PRACTCAL-II	L	T	P	C
		0	0	5	4
Objective (s)	To develop skill in quantitative analysis using gravimetric and colorimetric methods.				
Course outcome (s)					
CO1	To enable the students to develop analytical skills in inorganic quantitative analysis.				
CO2	To understand the principles behind gravimetry and to apply it in quantitative analysis.				
CO3	To understand the principles behind colorimetry and to apply it in quantitative analysis.				

SEMESTER VI

Course Code: CHE6B17(P)

Core Course XVII: INORGANIC CHEMISTRY PRACTCAL-III

Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal 20 & External 80)

CHE6B17(P)	INORGANIC CHEMISTRY PRACTCAL-III	L	T	P	C
		0	0	5	4
Objective (s)	To develop skill in quantitative analysis of inorganic compounds.				
Course outcome (s)					
CO1	To enable the students to develop skills in inorganic quantitative analysis.				
CO2	To understand the principles behind inorganic mixture analysis and to apply it in quantitative analysis.				
CO3	To analyse systematically mixtures containing two cations and two anions.				

SEMESTER VI

Course Code: CHE6B18(Pr)

Core Course XVIII: PROJECT WORK

Total Hours: 32; Credits: 2; Hours/Week: 2 (Semester V); Total Marks 75 (Internal 15 & External 60)

CHE6B18(Pr)	PROJECT WORK	L	T	P	C
		0	0	2	2
Objective (s)	To develop skill in scientific research, critical thinking and reasoning.				
Course outcome (s)					
CO1	To understand the scientific methods of research project.				
CO2	To apply the scientific method in life situations.				
CO3	To analyse scientific problems systematically.				

CHEMISTRY COMPLEMENTARY COURSE STRUCTURE

Total Credits: 12 (Internal: 20%; External: 80%)

<i>Semester</i>	<i>Code No</i>	<i>Course Title</i>	<i>Hrs/Week</i>	<i>Total Hrs</i>	<i>Credit</i>	<i>Marks</i>
I	CHE1C01	Complementary Course I: General Chemistry	2	32	2	75
	-	Complementary Course V: Chemistry Practical	2	32	-*	-
II	CHE2C02	Complementary Course II: Physical Chemistry	2	32	2	75
	-	Complementary Course V: Chemistry Practical	2	32	-*	-
III	CHE3C03	Complementary Course III: Organic Chemistry	3	48	2	75
	-	Complementary Course V: Chemistry Practical	2	32	-*	-
IV	CHE4C04	Complementary Course IV: Physical and Applied Chemistry	3	48	2	75
	CHE4C05(P)	Complementary Course V: Chemistry Practical	2	32	4*	100
Total					12	400

* Examination will be held at the end of semester IV.

SEMESTER I

Course Code: CHE1C01

Complementary Course I: GENERAL CHEMISTRY

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

CHE1C01	GENERAL CHEMISTRY	L	T	P	C
		2	0	0	2
Objective(s)	To provide the students a thorough knowledge about the chemistry of quantitative and qualitative analysis and the theories of chemical bonding. It will also impart the ideas about atomic nucleus and the importance of metals in biological systems.				
Course outcome (s)					
CO1	To understand and to apply the theories of quantitative and qualitative analysis.				
CO2	To understand the theories of chemical bonding.				
CO3	To appreciate the uses of radioactive isotopes.				
CO4	To understand the importance of metals in biological systems.				

SEMESTER II**Course Code: CHE2C02****Complementary Course II: PHYSICAL CHEMISTRY**

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

CHE2C02	PHYSICAL CHEMISTRY	L	T	P	C
		2	0	0	2
Objective(s)	To provide the students a thorough knowledge about different terminologies in thermodynamics and the continuity between different states of matter. To impart an idea about the basic principles of electrochemistry.				
Course outcome (s)					
CO1	To understand the importance of free energy in defining spontaneity.				
CO2	To realise the theories of different states of matter and their implication.				
CO3	To understand the basic principles of electrochemistry.				

SEMESTER III**Course Code: CHE3C03****Complementary Course III: ORGANIC CHEMISTRY**

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE3C03	ORGANIC CHEMISTRY	L	T	P	C
		3	0	0	2
Objective(s)	To provide the students a thorough knowledge about basic theory and concepts of organic chemistry.				
Course outcome (s)					
CO1	To understand the basic concepts involved in reaction intermediates.				
CO2	To realise the importance of optical activity and chirality.				
CO3	To appreciate the importance of functional groups and aromatic stability.				
CO4	To understand the basic structure and importance of carbohydrates, nucleic acids, alkaloids and terpenes.				

SEMESTER IV**Course Code: CHE4C04****Complementary Course IV: PHYSICAL AND APPLIED CHEMISTRY**

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

CHE4C04	PHYSICAL AND APPLIED CHEMISTRY	L	T	P	C
		3	0	0	2
Objective (s)	To provide the students a thorough knowledge about colloidal chemistry, nanochemistry and the importance of chemistry in daily life. It also provides a basic idea related to separation and spectral techniques. It also imparts the idea of green processes with special emphasis on environment.				
Course outcome (s)					
CO1	To understand the basic concepts behind colloidal state and nanochemistry.				
CO2	To understand the importance of green chemistry and pollution prevention.				
CO3	To appreciate the importance of different separation methods and spectral techniques.				
CO4	To understand the extent of chemistry in daily life.				

SEMESTER IV**Course Code: CHE4C05(P)****Complementary Course V: CHEMISTRY PRACTICAL**Total Hours: 128; Credits: 4; Hours/Week: 2 (I, II, III & IV Semesters); Total Marks 100
(Internal 20 & External 80)

CHE4C05(P)	CHEMISTRY PRACTICAL	L	T	P	C
		0	0	2	4
Objective (s)	To develop proficiency in quantitative and qualitative analysis and expertise in organic preparation and determination of physical constants.				
Course outcome (s)					
CO1	To understand the basic concepts of inter group separation.				
CO2	To enable the students to develop analytical and preparation skills.				

OPEN COURSE STRUCTURE**(FOR STUDENTS OTHER THAN B.Sc. CHEMISTRY) Total Credits: 3 (Internal 20%; External 80%)**

<i>Semester</i>	<i>Code No</i>	<i>Course Title</i>	<i>Hrs/Week</i>	<i>Total Hrs</i>	<i>Marks</i>
V	CHE5D01	Open Course 1: Environmental Chemistry	3	48	75
	CHE5D02	Open Course 2: Chemistry in Daily Life			
	CHE5D03	Open Course 3: Food Science and Medicinal Chemistry			

SEMESTER V

Course Code: CHE5D01

Open Course 1: ENVIRONMENTAL CHEMISTRY

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcomes

At the end of the course, students will be able to:

CO 1: Recall the technical/scientific terms involved in pollution.

CO 2: Understand the causes and effects of air pollution.

CO 3: Understand the sources, types and effects of water pollution.

CO 4: Describe water quality parameters.

CO 5: Know soil, noise, thermal and radioactive pollutions and their effects.

CO 6: Study various pollution control measures.

CO 7: Understand the basics of green chemistry.

SRI VYASA NSS COL

B.Sc. BOTANY

AIMS AND OBJECTIVES OF THE PROGRAMME

The Board of Studies in Botany (UG) recognizes that curriculum, course content and assessment of scholastic achievement play complementary roles in shaping education. The revised Curriculum for Undergraduate Programme of Botany envisages Undergraduate Education as a combination of general and specialized education, simultaneously introducing the concepts of breadth and depth in learning. The present attempt is to prepare the students for lifelong learning by drawing attention to the vast world of knowledge of plants and introducing them to the methodology of systematic academic enquiry. The crew of the syllabus ensures firm footing in fundamental aspects of Botany and wide exposure to modern branches of Botany to the students.

The expected outcome of the syllabus

1. To know the scope and importance of Botany
2. To inculcate interest in nature with its myriad living forms
3. To develop scientific temper among students
5. To undertake scientific projects
6. To give better exposure to the diversity of life forms
7. To give awareness about natural resources and their importance in sustainable development
9. To provide opportunities for the application of the acquired knowledge in day to day life.
10. To develop skill in doing practical experiments, familiarizing equipment's and biological specimens .

PROGRAMME OUTCOMES

1. **Critical Thinking:** Take informed actions after identifying the assumptions that frame students' thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at their ideas and decisions (intellectual, organizational, and personal) from different perspectives.
2. **Problem Solving:** Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
3. **Effective Communication:** Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
4. **Effective Citizenship:** Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

5. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

6. Self-directed and Life-long Learning: Acquire the ability to engage in independent and lifelong learning in the broadest context of socio-technological changes

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1. Scope and importance of Botany: Understand scope and importance of Botany in every field especially in dealing with societal and environmental issues, agriculture, ethics and healthcare.

2. Environmental concern: Understand the and the role of plants in sustaining life on earth and the interrelationship between human beings and nature, create awareness on natural resources and their importance in sustainable development, analyze the importance of biodiversity conservation, estimate biodiversity loss and develop conservation strategies.

3. Scientific temper: Develop scientific temper and undertake scientific projects.

4. Practical applications: Identify and classify plants according to the principles of plant systematics, apply techniques like plant propagation methods, organic farming, mushroom cultivation, preparation of biofertilizers, biopesticides etc. in daily life.

5. Awareness on life processes: Understand plant life processes, biomolecules, basic hereditary and evolutionary principles. The expected outcome of the syllabus

1. To know the scope and importance of the Botany

2. To inculcate interest in nature with its myriad living forms

3. To develop scientific among students

4. To undertake scientific projects

5. To give better exposure to the diversity of life forms

6. To give awareness about natural resources and their importance in sustainable development

7. To provide opportunities for the application of the acquired knowledge in day to day life.

8. To develop skill in doing practical experiments, familiarizing equipment's and biological specimens.

B.Sc. PHYSICS

Aims of UG program in Physics.

The aims and objectives of our UG educational programs in sciences in general and Physics in particular should be structured to

- Create the facilities and environment in all the educational institutions to consolidate the knowledge acquired at +2 level and to motivate and inspire the students to create deep interest in Physics, to develop broad and balanced knowledge and understanding of physical concepts, principles and theories of Physics.
- Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
- Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
- Expose the student to the vast scope of Physics as a theoretical and experimental science with applications in solving most of the problems in nature spanning from 10⁻¹⁵ m to 10²⁶m in space and 10⁻¹⁰ eV to 10²⁵eV in energy dimensions.
- Emphasize the discipline of Physics to be the most important branch of science for pursuing the interdisciplinary and multidisciplinary higher education and/or research in interdisciplinary and multidisciplinary areas.
- To emphasize the importance of Physics as the most important discipline for sustaining the existing industries and establishing new ones to create job opportunities at all levels of employment.

Programme Specific Outcomes [PSO]

PSO1: Understand the basic concepts of methodology of science and the fundamentals of mechanics, properties of matter and electrodynamics

PSO2: Understand the theoretical basis of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics and thermodynamics

PSO3: Understand and apply the concepts of electronics in the designing of different analog and digital circuits

PSO4: Understand the basics of computer programming and numerical analysis

PSO5: Apply and verify theoretical concepts through laboratory experiments.

B.Sc. MATHEMATICS

The overall aim of B.Sc. Mathematics and B.A./B.Sc. with Mathematics as a Complementary course is to

1. Create deep interest in learning mathematics;
2. Develop broad and balanced knowledge and understanding of definitions, concepts, principles and theorems;
3. Familiarize the students with suitable tools of mathematical analysis to handle issues and problems in mathematics and related sciences;
4. Enhance the ability of learners to apply the knowledge and skills acquired by them during the programme to solve specific theoretical and applied problems in mathematics;
5. Provide students/learners sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with mathematics;
6. Encourage the students to develop a range of generic skills helpful in employment, internships and social activities.

Programme Outcome- B.Sc. Mathematics

- Enabling students to develop a positive attitude towards Mathematics as an interesting and valuable subject of study.
- A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved with mathematical reasoning.
- Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- Introduction to various courses like group theory, ring theory, field theory, metric spaces and number theory.
- Enhancing students' overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
- Ability to pursue advanced studies and research in pure and applied Mathematical Science.

Programme Specific Outcomes

A student should be able to

- Think in a critical manner.
- Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
- Formulate and develop mathematical arguments in a logical manner
- Acquire good knowledge and understanding in advanced areas of Mathematics and Statistics.
- Understand, formulate and use quantitative models arising in Social science, Business and other contexts.
- Recall basic facts about mathematics and should be able to display knowledge of conventions such as notations and terminology.
- Equip with mathematical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.

B.A ECONOMICS

Program outcomes

The curriculum of economics is intellectually fascinating and challenging. Economics governs the life of the individual society and the modern states. The subject plays a significant role in the international affairs. The study in economics also contribute to understand the development of many policies across a wide dimension of subjects including health care climate change and pollution,, social welfare reforms in banking, financial markets, labour market dynamics, economic development aspects for solving poverty, unemployment,. Regional disparity etc. With the drastic transformation of the economy in the recent decades there is a growing demand for trained economists from diverse fields such as government finance and banking social sector and management, business policy making and teaching. Studying economics equips students to take better decisions leading increasing the economic security and wellbeing of the people and society. Economics course will give in-depth understanding of core economic theory and how to apply it in real business world. The knowledge of economics helps a student to develop a range of transferable skills such as, communication, highly quantitative, problem solving, time management etc. Towards understanding the human behaviour and understanding world better and to understand how things in society and become wise decision makers.

To put it in a broad sense, higher education especially in the field of social science must aim at:

1. To train students to understand the society, economy and the world at large
2. To equip them with the right analytical skills to acquire a 'vision'
3. To enjoy life time learning.'

It is necessary to repeat that the goal of higher education is two fold: Knowledge Creation and its utilization through activities that are useful to the learners as well as the society.

Coming to the curriculum of Economics, our objective is to impart:

- A knowledge of fundamental concepts and theoretical propositions
- A methodology by which economic ideas are framed, tested and modified
- An understanding of the institutions, social, political and economic, that influence Economic issues
- An ability to present one's own analysis of the problems and issues in the language of an 'Economist'

Teaching of Economics lack relevance if they do not help in the understanding of the laws of motion of the economy and society where one lives.

- The idea is to make the student at the undergraduate level understand correctly the basic concepts and terms used in Economics and to give him an exposure to the way economic problems and issues are to be looked at with out any bias.
- For this, what is needed is a set of CORE courses and ELECTIVE courses. The core course may consist of two parts (a) Basic Concepts, terms and theories and (b) Application areas.

(b) Application areas.

- The first will have Papers like MICROECONOMICS, MACROECONOMICS, MATHEMATICS FOR ECONOMICS, POLITICAL ECONOMY OF DEVELOPMENT with special reference to INDIA and KERALA etc.
- The elective courses will have, FINANCIAL ECONOMICS, PUBLIC ECONOMICS, INTERNATIONAL ECONOMICS, ENVIRONMENTAL ECONOMICS, HEALTH ECONOMICS, etc., to enable the students to get an exposure to the application of what he is going to learn in CORE courses.

ELECTIVE Courses shall be short courses. A few of them are to be framed to suit ECONOMICS students and others specially suited to non-Economics students. All elective courses should contain substantial active learning component to give depth to the curriculum. This includes writing reports, oral presentations, and research projects. This will reinforce the empirical skills students have acquired in the course on quantitative methods.

B.A. ENGLISH

ENG1 A01: *THE FOUR SKILLS FOR COMMUNICATION*

1. OBJECTIVES OF THE COURSE

To train learners in the Basic English Language Skills, word building, soft skills and effective communication

2. COURSE DESCRIPTION

Module 1: English for Communication	10 hours
Module 2: Primary Skills	15 hours
Module 3 : Secondary Skills	15 hours
Module 4: Grammar	20 hours

Evaluation	12 hours
	Total 72 hours

ENG1 A02: *MODERN PROSE AND DRAMA*

1. OBJECTIVE OF THE COURSE

- a. To introduce learners to representative English prose from different cultural and geographical backgrounds
- b. To cultivate their tastes in drama
- c. To expose to logical and imaginative writing

ENG2 A03 *INSPIRING EXPRESSIONS*

COURSE CODE	ENG2 A03
TITLE OF THE COURSE	<i>INSPIRING EXPRESSIONS</i>
SEMESTER IN WHICH THE COURSE TO BE TAUGHT	2
NO. OF CREDITS	4
NO. OF CONTACT HOURS	72(4hrs/wk)

1. OBJECTIVES OF THE COURSE

- a. To acquaint the students with Short Stories
- b. To cultivate their tastes in English Poetry
- c. To expose to imaginative writing

ENG2 A03 INSPIRING EXPRESSIONS

COURSE CODE	ENG2 A03
TITLE OF THE COURSE	<i>INSPIRING EXPRESSIONS</i>
SEMESTER IN WHICH THE COURSE TO BE TAUGHT	2
NO. OF CREDITS	4
NO. OF CONTACT HOURS	72(4hrs/wk)

1. OBJECTIVES OF THE COURSE

- a. To acquaint the students with Short Stories
- b. To cultivate their tastes in English Poetry
- c. To expose to imaginative writing

ENG2 A04 *Readings on Society*

COURSE CODE	ENG2 A04
TITLE OF THE COURSE	<i>READINGS ON SOCIETY</i>
SEMESTER IN WHICH THE COURSE TO BE TAUGHT	2
NO. OF CREDITS	4
NO. OF CONTACT HOURS	90(5hrs/wk)

1. Objectives of the Course

- a. To introduce learners to various issues in the contemporary society
- b. To create an awareness of preservation of the environment and nature
- c. To inculcate the spirit of social life, values, duties and rights

ENG3 A05 NATIVE MEDIA IN ENGLISH

COURSE CODE	ENG3 A05
TITLE OF THE COURSE	<i>NATIVE MEDIA IN ENGLISH</i>
SEMESTER IN WHICH THE COURSE TO BE TAUGHT	3
NO. OF CREDITS	4
NO. OF CONTACT HOURS	90(5hrs/wk)

1. OBJECTIVE OF THE COURSE

- To inculcate native feelings among the learners
- To provide contemporary cultural and social awareness of Kerala through English

ENG4 A06: *Reading Fiction and Non Fiction*

COURSE CODE	ENG4 A06
TITLE OF THE COURSE	<i>Reading Fiction and Non Fiction</i>
SEMESTER IN WHICH THE COURSE TO BE TAUGHT	4
NO. OF CREDITS	4
NO. OF CONTACT HOURS	90(5hrs/wk)

1. OBJECTIVES OF THE COURSE

1. To develop reading fictional and nonfictional works from a national perspective.
2. To improve language skills through literature
3. To promote writing narratives.

SRI VYASA NSS COLLEGE

B.A. HISTORY

BA HISTORY-Core Courses

1. HIS 1B01 Trends In Historiography
2. HIS 2B02 Trends in Indian Historiography
3. HIS 3B03 World History -1
4. HIS 4B04 Indian History -1
5. HIS 4B05 World History- 2
6. HIS 4B06 Indian History -2
7. HIS 5B07 World History-3
8. HIS 5B08 Indian History-3
9. HIS 5B09 Kerala History-1
10. HIS 5B10 Methodology of the Writing of History
11. HIS 6B11 Indian History-4
12. HIS 6B12 Kerala History-2
13. HIS 6B13 Gender Studies
14. HIS 6B14 Indian Heritage and Plurality of Cultures
15. HIS 6B15 Dissertation/Writing Local History

COURSE OUTCOMES

- CO1 Proper orientation in the skills required for the study and analysis of history.
- CO2 Proper understanding of the phases and land marks of History at macro and micro levels.
- CO3 Sound training in historical investigations and explorations.
- CO4 Inculcation of a high sense of humanity and human values with historical conviction.
- CO5 Catering to employability in a variety of professional fields.

PROGRAMME OUTCOMES

- PO1 Objective understanding and scientific pursuit of knowledge in the discipline of History.
- PO2 Critical thinking and analysis in social, political and cultural developments.
- PO3 Civic consciousness, social interaction and effective communication skills.
- PO4 Sense of citizenship and democratic values in public life.
- PO5 Tolerance towards India's cultural diversity, and spirit of national integration.
- PO6 Good Understanding of the Phases of India's Nationalist Movement and Struggle for Freedom.
- PO7 Theoretical Perspective on Social and Political Issues
- PO8 Sound Understanding of the Indian Heritage in Different Fields.
- PO9 Sound Basis in Academic Writing in the Discipline of History.

PO10 Development of Proper Historical Consciousness.

PROGRAM SPECIFIC OUTCOME

PSO 1 Good understanding of the different schools of Historiography.

PSO 2 Good understanding of the historiographical ventures undertaken by Indian scholars.

PSO 3 A proper understanding of the Phases of World History.

PSO 4 A thorough understanding of the land marks of Indian history.

PSO 5 A critical perspective on the courses of the evolution of India as a nation.

PSO 6 A sound knowledge of the emergence of political consciousness and national liberation

PSO 7 Orientation in historical research and writing history.

SRI VYASA NSS COLLEGE

B. COMM. PROGRAMME

Programme objectives

- To equip the students with the skills of preparing financial statements for various type of organizations.
- To enable the students to acquire knowledge about financial reporting standards and to understand corporate accounting methods.
- To familiarize the students with certain statutes concerning and affecting business organizations in their operations.
- To familiarize the students with the various concepts and elements of cost.
- To create cost consciousness among the students.
- To enable the students to have the concept and relevance of Management Accounting.
- To provide the students an understanding about the use of accounting and costing data for planning, control, and decision making.
- To enable students for acquiring basic knowledge in business research methods and to develop basic skills in them to conduct survey researches and case studies.
- To impart basic knowledge and equip students with application of principles and provisions Income - tax Act, 1961 amended up to date.
- To impart basic knowledge and equip students with application of principles and provisions Income - tax Act, 1961 and GST Act 2016
- To provide knowledge of auditing principles and techniques and to familiarize the students with the understanding of issues and practices of corporate governance in the global and Indian context.
- To provide basic knowledge about the structure, organization and working of financial system in India.
- To familiarize the students with the world of investments.
- To provide a theoretical framework for the analysis and valuation of investments.
- To acquire knowledge about financial derivatives and their features
- To familiarize the concepts, tools and practices of financial management.

The course of study leading to the award of B.Com shall comprise the following:-

Semester I

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Common	BCM1A01(English)	4	4	20	80	100
Common	BCM1A02 (English)	5	3	20	80	100
Common	BCM1A07 (Language)	5	4	20	80	100
Core	BCM1B01 Business Management	6	4	20	80	100
Compl.	BCM1C01 Managerial Economics	5	4	20	80	100
	Total	25	19	100	400	500

Semester II

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Common	BCM2A03 (English)	4	4	20	80	100
Common	BCM2A04 (English)	5	3	20	80	100
Common	BCM2A08 (Language)	5	4	20	80	100
Core	BCM2B02 Financial Accounting	6	4	20	80	100
Compl.	BCM2C02 Marketing Management	5	4	20	80	100
	Total	25	19	100	400	500

Semester III

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Common	BCM3A11 Basic Numerical Methods	5	4	20	80	100
Common	BCM3A12 Professional Business Skills	5	4	20	80	100
Core	BCM3B03-Business regulation	4	4	20	80	100
Core	BCM3B04 Corporate Accounting	6	4	20	80	100
Compl.	BCM3C03 Human Resources & Management	5	4	20	80	100
	Total	25	20	100	400	500

Semester IV

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Common	BCM4A13 Entrepreneurship Development	5	4	20	80	100
Common	BCM4A14 Banking and Insurance	5	4	20	80	100
Core	BCM4B05 Cost Accounting	6	4	20	80	100
Core	BCM4B06 Corporate Regulations	4	4	20	80	100
Compl.	BCM4C04 Quantitative Techniques for Business	5	4	20	80	100
	Total	25	20	100	400	500

Semester V

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Core	BCM5B07 Accounting for Management	5	4	20	80	100
Core	BCM5B08 Business Research Methods	4	4	20	80	100
Core	BCM5B09 Income Tax Law and Accounts	5	4	20	80	100
Core	BCM5B10 Course in Specialisation	4	4	20	80	100
Core	BCM5B11 Course in Specialisation	4	4	20	80	100
Open	BCM5D01 Open Course (For students from other Departments)	3	3	10	40	50
	Total	25	23	110	440	550

Semester VI

Course	Title	Contact Hours	Credits	Internal	External	Total Marks
Core	BCM6B12 Income Tax and GST	6	4	20	80	100
Core	BCM6B13 Auditing and Corporate Governance	5	4	20	80	100
Core	BCM6B14 Course in Specialisation	5	4	20	80	100
Core	BCM6B15 Course in Specialisation	5	5	20	80	100
Core Project	BCM6B16 (PR) Three Weeks Project and Viva-Voce	4	2	10	40	50
	Total	25	19	90	360	450

Core Courses in the area of Specialization:

FINANCE

1. Financial Markets and Services
2. Financial Management
3. Fundamentals of Investments
4. Financial Derivatives

PG PROGRAMMES

M.Sc. Chemistry

Pattern of the Programme

- a) The name of the programme shall be M.Sc. Chemistry under CSS pattern.
- b) The programme shall be offered in four semesters within a period of two academic years.
- c) Eligibility for admission will be as per the rules laid down by the University from time to time.
- d) Details of the programme offered for the programme are given in Table 1. The programme shall be conducted in accordance with the programme pattern, scheme of examination and syllabus prescribed. Of the 25 hours per week, 12 hours shall be allotted for theory, 12 hours for practical and 1 hour for seminar.

Theory Courses

In the first three semesters there will be four theory courses and in the fourth semester three theory courses. All the theory courses in the first and second semesters are core courses. In the third semester there will be three core theory courses and one elective theory course. Colleges can choose any one of the elective courses given in the table 1. In the fourth semester there will be two core theory courses and one elective theory course. Colleges can select any one of the elective courses from those given in the table 1. However a student may be permitted to choose any other elective course in the third and fourth semesters, without having any lecture classes. Only one elective course chosen by the college both in the third and fourth semesters will be considered for calculating the workload of teachers. All the theory courses in the first, second and third semesters are of 3 credits while the theory courses in the fourth semester are of 4 credits.

Practical Courses

In each semester, there will be three core practical courses. However the practical examinations will be conducted only at the end of second and fourth semesters. At the end of second semester, three practical examinations with the codes CH1PO1 & CH2PO4, CH1PO2 & CH2PO5 and CH1PO3 & CH2PO6 will be conducted. Practical examinations for the codes CH3PO7 & CH4P10, CH3PO8 & CH4P11 and CH3PO9 & CH4P12 will be conducted at the end of fourth semester. Each practical examination will be of six hour duration and 4 credits.

Three hours per week in the fourth semester are allotted for conducting individual project work by the students under guidance of a faculty and it can be treated as practical hours while working out the workload of teachers.

Project and Viva Voce

Each student has to perform an independent research project work during the programme under the guidance of a faculty member of the college/ scientists or faculties of recognised research institutions. Projects done in the quality control or quality analysis division of the industries will not be considered. At the same time, projects done in the R & D division of reputed industry can be considered. Each student has to submit three copies of the project dissertation for valuation at the end of fourth semester. After the valuation one copy may be returned to the student, one may be given to the project supervisor and the third one should be kept in the department/college library. Evaluation of the project work (4 credits) will be done on a separate day at the end of fourth semester, after the theory examinations. Viva voce on the project will also be done on the same day. Viva voce examinations, based on the theory and practical courses, will be conducted at the end of second and fourth semesters (2credits each), on a separate day.

M.Sc. CHEMISTRY

PROGRAMME SPECIFIC OUTCOMES

- To solve and understand the major concepts of chemistry
- To develop critical thinking and use of scientific knowledge to carry out and analyze chemical reactions
- Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community
- To inculcate the scientific temperament in the students and outside the scientific community
- Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.
- Have sound knowledge about the fundamentals and applications of chemical and scientific theories

PROGRAMME OUTCOMES

Theory

- Explain Schrodinger equation for various quantum chemical models such as, particle in a box, harmonic oscillator, rigid rotor models and their quantum chemical description
- Understand Hamiltonian operators and approximation methods and apply to many electron systems and chemical bonding
- Run various quantum chemical and molecular dynamics software, such as Gaussian, Gamess and explain chemical principles using computational modelling
- Understanding periodic table, main group elements, lanthanides, organometallic complexes and the basics of nuclear chemistry and radio analytical techniques
- Study the concepts of green chemistry and applications of green chemistry for sustainable development
- Know the structure of supramolecules, molecular recognition and applications of supramolecules in miniaturization of molecular devices
- Discuss drug designing and development and mode of action of different drugs
- Study the mechanistic aspect of organic reactions and their conformational analysis and the conversion of different functional group via rearrangement reaction.

- correlate and differentiate Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics and explain the partition function and specific heat capacities
- Solve structural problems based on UV-Vis, IR, ¹HNMR, ¹³CNMR and mass spectral data.
- Explain the formation and stability of the coordination complexes
- Elucidate the kinetics and reaction mechanism of coordination complexes including redox reactions
- Elucidate the size -dependent physicochemical properties of nano materials and their characterisation techniques
- Understanding various synthesis steps that applies to industrial application
- Basic idea on applications of various instruments and their use
- To have an understanding on the effective use of Chemistry for the sustain progress and judicious use of resources of our mother nature

Practical

- Set up the apparatus for the purification, isolation, synthesis and characterization of certain compounds and operate and apply various spectroscopic techniques for identification and their quantification
- Handle and use different organic and inorganic reagents.
- To be familiar with experimental techniques for controlling chemical reactions
- Development of experimental skills on conductivity meter, potentiometer, pH meter and voltammeter for different applications
- To verify the basic laws in Physical Chemistry through experiments
- To have better understanding of concepts and to inculcate experimental skills in students

Project

- To expose the students to the literature review and how to design and execute small reaction schemes and to write a Project report/manuscript writing and presentation

TABLE 1
Courses offered for M.Sc. Chemistry Programme under CSS
Patten in Affiliated Colleges (2015 onwards)

Semester	Course Code	Course Title	Instruction/Week	Credits
I	CH1CO1	Basic concepts in quantum chemistry and group Theory	3	3
	CH1CO2	Elementary inorganic chemistry	3	3
	CH1CO3	Structure and reactivity of organic compounds	3	3
	CH1CO4	Thermodynamics, kinetics and catalysis	3	3
	CH1PO1	Inorganic chemistry practical I	4	-
	CH1PO2	Organic chemistry Practical I	4	-
	CH1PO3	Physical chemistry practical I	4	-
		Total credits:	Core	12
II	CH2CO5	Applications of quantum mechanics and group theory	3	3
	CH2CO6	Coordination chemistry	3	3
	CH2CO7	Organic reaction mechanisms	3	3
	CH2CO8	Electrochemistry, solid state chemistry and Statistical Thermodynamics	3	3
	CH2PO4	Inorganic chemistry practical II	4	4
	CH2PO5	Organic chemistry practical II	4	4
	CH2PO6	Physical chemistry practical II	4	4
	CH2VO1	Viva voce		2
		Total credits:	Core Viva	24 2
III	CH3CO9	Molecular spectroscopy	3	3
	CH3C10	Organometallic & Bioinorganic chemistry	3	3
	CH3C11	Organic transformations and reagents	3	3
	CH3PO7	Inorganic chemistry practical III	4	
	CH3PO8	Organic chemistry practical III	4	
	CH3PO9	Physical chemistry practical III	4	
	CH3EO1	Synthetic organic chemistry(Elective)	3	3
	CH3EO2	Computational chemistry(Elective)	3	3
	CH3EO3	Green and Nanochemistry(Elective)	3	3
		Total Credits:	Core Elective	9 3

	CH4C12	Advanced Topics in Chemistry	4	4
	CH4C13	Instrumental Methods of Analysis	4	4
	CH4P10	Inorganic Chemistry Practical IV	3	4
	CH4P11	Organic Chemistry Practical IV	3	4
	CH4P12	Physical Chemistry Practical IV	3	4
	CH4EO4	Petrochemicals and Cosmetics(Elective)	4	4
	CH4EO5	Industrial Catalysis(Elective)	4	4
	CH4EO6	Natural Products & Polymers(Elective)	4	4
	CH4EO7	Material Science(Elective)	4	4
	CH4PrO1	Research Project	3	4
	CH4VO2	Viva Voce		2
IV	Total Credits:			
			Core	20
			Elective	4
			Project	4
			Viva	2
TOTAL CREDITS OF THE PROGRAMME				
			CORE	65
			ELECTIVE	7
			PROJECT	4
			VIVA VOCE	4
			TOTAL CREDITS	80

M. Sc. PHYSICS

PROGRAMME OBJECTIVES

- To develop strong student competencies in Physics and its applications in a technology-rich, interactive environment.
- To make the students technically and analytically skilled.
- To impart high quality education in Physical Sciences.
- To prepare students to take up challenges as globally competitive physicists/researchers
- To prepare them to take up higher studies of interdisciplinary nature.

PROGRAMME OUTCOMES

- The students will obtain good knowledge in Physical Sciences.
- They will be trained to compete national level tests
- They will be prepared to take up challenges as globally competitive physicists/researchers
- They will be capable of taking up higher studies of interdisciplinary nature.

The duration of the M.Sc (Physics) programme shall be 2 years, split into 4 semesters. Each course in semester has 4 credits (4C) and Practicals having 2 credits (2C). The total credits for the entire programme 80. The scheme and syllabus of the programme, consisting of sections (a) *Courses in various semeste* (b) *Constitution of clusters* (c) *The Credits and Hours* (d) *Grading and Evaluation* (e) *Detailed syllabus* (f) *Mod question papers* are as follows:

A) COURSES IN VARIOUS SEMESTERS

Semester -I (16C)

(PHY1C01) Classical Mechanics (4C)
(PHY1C02) Mathematical Physics - I (4C)
(PHY1C03) Electrodynamics and Plasma Physics (4C)
(PHY1C04) Electronics (4C)
(PHY1P01) General Physics Practical -I
(PHY1P02) Electronics Practical -I

Semester -II (22C)

(PHY2C05) Quantum Mechanics -I (4C)
(PHY2C06) Mathematical Physics -II (4C)
(PHY2C07) Statistical Mechanics (4C)
(PHY2C08) Computational Physics (4C)
(PHY2P03) General Physics Practical -II (3C)
(PHY2P04) Electronics Practical -II (3C)

External Practical Exam. for PHY1P01 & PHY2P03, PHY1P02 & PHY2P04

Semester -III (16C)

(PHY3C09) Quantum Mechanics -II (4C)
(PHY3C10) Nuclear and Particle Physics (4C)
(PHY3C11) Solid State Physics (4C)
Elective -I (4C)
(PHY4Pr) Project
(PHY3P05) Modern Physics Practical -I

Semester -IV (26C)

(PHY4C12) Spectroscopy (4C)
Elective -II (4C)
Elective -III (4C)
(PHY4Pr1) Project (4C)
(PHY4P06) Modern Physics Practical -II (3C)
(PHY4P07) Computational Physics Practical (3C)
Viva Voce (Comprehensive) (4C)

External Practical Exam. for PHY3P05 & PHY4P06, PHY4P07 and Comprehensive Viva Voce.

B) CONSTITUTION OF CLUSTERS

Elective -I Cluster:

- (PHY3E01) Plasma Physics
- (PHY3E02) Foundations of Quantum Mechanics
- (PHY3E03) Radiation Physics
- (PHY3E04) Computer Software and Applications
- (PHY3E05) Fluid Dynamics
- (PHY3E06) Digital Signal Processing
- (PHY3E07) Experimental techniques

Elective -II Cluster:

- (PHY4E08) Advanced Nuclear Physics
- (PHY4E09) Astrophysics
- (PHY4E10) Advanced Statistical Mechanics
- (PHY4E11) Materials Science
- (PHY4E12) Electronic Instrumentation
- (PHY4E13) Lasers and Fibre Optics
- (PHY4E14) Communication Electronics

Elective -III Cluster:

- (PHY4E15) Quantum Field Theory
- (PHY4E16) Chaos and Nonlinear Physics
- (PHY4E17) Advanced Condensed Matter Physics
- (PHY4E18) Modern Optics
- (PHY4E19) Physics of Semiconductors
- (PHY4E20) Microprocessors and Applications

M.Sc Mathematics

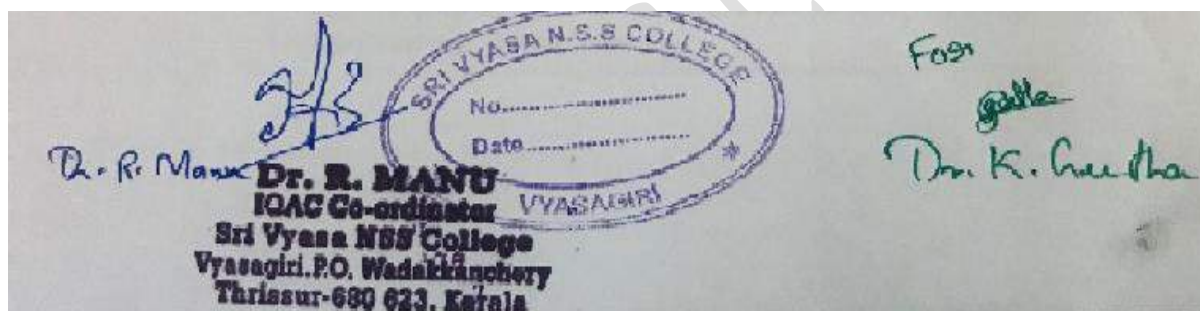
PROGRAMME OUTCOMES

- Occupy the students to apply the knowledge of Mathematical science to solve real life problems.
- Inculcate ability to design the methodology suitable or model to the problem encountered in all phases of life.
- Equip the student with skills to analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- Acquire ability to analyze and interpret outputs and generate new ideas based on the outputs.
- Inculcate critical thinking to carry out scientific investigations objectively without being biased with preconceived notions.
- Prepare students for pursuing research or careers in industry in Mathematical sciences and allied fields.
- Imbibe effective scientific and/or technical communication in both oral and writing.
- Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in Mathematical sciences.
- Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

PROGRAMME SPECIFIC OUTCOMES

- Understanding of the fundamental axioms in Mathematics and capability of developing ideas based on them.
- Inculcate Mathematical reasoning and motivate students for research studies in mathematics and related fields.
- Provide knowledge of a wide range of Mathematical techniques and application of Mathematical methods/tools in other scientific and engineering domains.
- Provide advanced knowledge on topics in pure Mathematics, empowering the students to pursue higher degrees at reputed academic institutions.
- Nurture problem solving skills, thinking and creativity through assignments and project work.
- Select, interpret and critically evaluate information from a range of sources that include books, scientific reports, journals, case studies and the internet.

- Critically interpret data, write reports and apply the basics of rules of evidence and also criticize mathematical arguments developed by themselves and others.
- Develop proficiency in the understanding, analysis and synthesis of complex physical problems and the use of mathematical or other appropriate techniques to solve them.
- Provide a systematic understanding of the concepts and theories of all branches of Mathematics and their application in the real world to an advanced level, and enhance career prospects in a huge array of fields.
- Demonstrate engagement with current research and developments in the subject and communicate effectively.
- Recognize the need to engage in lifelong learning through continuing education and research and equip them for competitive examinations.



UNIVERSITY OF CALICUT
SYLLABUS FOR THE M.Sc. (MATHEMATICS) PROGRAMME
UNDER CUCSS – PG – 2014
(Total Credits : 80)
EFFECTIVE FROM 2014 ADMISSIONS

Semester I

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/ Elective
MT1C01	Algebra- I	4	5	core
MT1C02	Linear Algebra	4	5	core
MT1C03	Real Analysis-I	4	5	core
MT1C04	Number Theory	4	5	core
MT1C05	Discrete Mathematics	4	5	core
MT1V06	Viva Voce	2		

Semester II

Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/ Elective
MT2C07	Algebra- II	4	5	core
MT2C08	Real Analysis-II	4	5	core
MT2C09	Topology	4	5	core
MT2C10	ODE and Calculus of Variations	4	5	core
MT2C11	Operations Research	4	5	core

Semester III

Course Code	Title of the Course	No. of Credits	Work Load Hrs./ week	Core/ Elective
MT3C12	Multivariable Calculus and Geometry	4	5	core
MT3C13	Complex Analysis	4	5	core
MT3C14	Functional Analysis	4	5	core
MT3C15	PDE and Integral Equations	4	5	core
	Project		5	core

MT3V16	Viva Voce	2		
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Semester IV

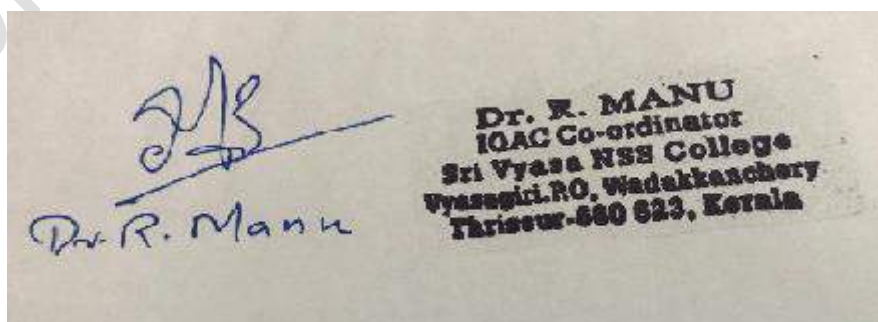
Course Code	Title of the Course	No. of Credits	Work Load Hrs./week	Core/ Elective
Elective-1		4	5	Elective
Elective-2		4	5	Elective
Elective-3		4	5	Elective
Elective-4		4	5	Elective
MT4C17	Project	4	5	core

CREDITS

Accumulated minimum credit required for successful completion of course shall be 80.

LIST OF ELECTIVES

- MT4E01 COMMUTATIVE ALGEBRA
- MT4E02 ALGEBRAIC NUMBER THEORY
- MT4E03 MEASURE AND INTEGRATION
- MT4E04 FLUID DYNAMICS
- MT4E05 ADVANCED OPERATIONS RESEARCH
- MT4E06 PROBABILITY THEORY
- MT4E07 COMPUTER ORIENTED NUMERICAL ANALYSIS
- MT4E08 ALGEBRAIC TOPOLOGY
- MT4E09 CRYPTOGRAPHY
- MT4E10 ADVANCED COMPLEX ANALYSIS
- MT4E11 ADVANCED FUNCTIONAL ANALYSIS
- MT4E12 DIFFERENTIAL GEOMETRY
- MT4E13 REPRESENTATION THEORY
- MT4E14 WAVELET THEORY
- MT4E15 GRAPH THEORY



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