

Bachelor of Science in Chemistry

Bachelor of Science in Chemistry program is designed to provide students with an excellent foundation in chemistry. It equips them with the necessary laboratory skills and scientific training needed in the competent practice of the chemistry profession. Lectures, seminars and laboratory classes are geared towards problem evaluation and decision-making. Courses in the humanities and social sciences are integrated to provide the perspective that will direct scientific efforts toward national concerns. Graduates are qualified to take the Chemistry Licensure Examination conducted by the Professional Regulation Commission and become licensed chemists.

	DLSU	CHED Minimum Requirements for BS Chem
General Education Courses	60 + (12)	39
Chemistry	73 (Core + Electives)	60
Thesis + Practicum	6	6
Other Science Courses	33	26
Information Technology Component	3	3
Total Number of Units	175 + (12)	
Duration	9 terms and 1 summer	

Expected Learning Outcomes or Competencies

A. Fundamental skills

1. Conceptual understanding and problem-solving skills in the fields of analytical, organic, inorganic, biochemistry, and physical chemistry
2. Ability to apply fundamental principles and concepts in physics and mathematics to chemical problems
3. Ability to evaluate, synthesize, and interpret scientific data and then draw logical conclusions
4. Ability to critically read primary papers
5. Ability to perform chemical computation and data processing

B. Practical skills

1. Laboratory skills relating to safety, waste management, and record keeping
2. Proper use of modern chemical instrumentation
3. Skills required for the conduct of standard laboratory procedures and use of instrumentation in analytical and synthetic work, in relation to both organic and inorganic systems
4. Skills in the monitoring, by observation and measurement, of chemical properties, events, or changes, and the systematic and reliable recording and documentation thereof

5. Ability to evaluate and interpret data derived from laboratory observations and measurements in terms of their significance, and to relate them to appropriate theories
6. Ability to design experiments and understand their limitations and the ability to design suitable alternative procedures and methods

C. Other skills

1. Communication skills, covering both written and oral communication. This includes the ability to present scientific information in a clear and concise manner and to discuss them intelligently, both in writing and orally.
2. Ability to dissect a problem into its key features; problem-solving skills relating to qualitative and quantitative information
3. Numeracy and calculation skills including skills such as error analysis, order-of-magnitude estimations, and correct use of units
4. Ability to use computers as information and research tools; skills in information retrieval and evaluation in relation to primary and secondary information sources, including information retrieval through on-line computer and traditional library searches
5. Interpersonal skills relating to the ability to interact with other people and to work in a team; ability to collaborate with other researchers
6. Study and self-development skills needed for continuing professional development and life-long learning
7. Ability to exercise ethical principles and social responsibility in their professional and personal endeavors

General Education Courses

Course Code	Course Title	Units
LASARE1	Lasallian Recollection 1	0
LASARE2	Lasallian Recollection 2	0
LASARE3	Lasallian Recollection 3	0
PERSEF1	Personal Effectiveness Foundation	(2)
PERSEF2	Personal Effectiveness Formation	(2)
PERSEF3	Personal Effectiveness Integrative	(2)
NSTP-C1/R1	NSTP Program-Civic Welfare Training Service Military Science 1	(3)
NSTP-C2/R2	NSTP Program-Civic Welfare Training Service Military Science 1	(3)
FWTEAMS	Physical Fitness and Wellness in Team Sports	2
FWSPORT	Physical Fitness and Wellness in Individual Sports	2
FWDANCE	Physical Fitness and Wellness in Dance	2
TREDONE	Humanity Search for Life	3
TREDTWO	The Filipino Christian in a Changing World	3
TREDTRI	The Christian and the Word	3
TREDFOR	The Christian Vocation of Life	3
ENGLCOM	Basic Communication and Study Skills	3
ENGLRES	Basic Research Skills/English for Specific Purposes	3
SPEECOM	Oral Communication/Advanced Speech Class	3
INTFILO	Introduction to Philosophy	3
GREATWK	Great Works	3
HUMALIT	Introduction to Literature	3
HUMAART	Introduction to Arts	3
FILKUMO	Komunikasyon sa Araling Filipino	3

FILDLAR	Pagbabasa at Pagsusulat sa Iba-Ibang Disiplina/Larangan	3
KASPIL1	Pag-aaral sa Buhay, mga Akda at Nagawa ni Dr. Jose Rizal	3
KASPIL2	Kasaysayan ng Pilipinas	3
SOCTEC1	Integrated Social Science, Technology and Society 1	3
SOCTEC2	Integrated Social Science, Technology and Society 2	3
BIOTICS	Bioethics	3
Total		60+(12)

Chemistry Courses

Course Code	Course Title	No. of Units
INOCHE1	General Chemistry 1	3
LBYCH17	General Chemistry 1 Laboratory	2
INOCHE2	General Chemistry 2	3
LBYCH18	General Chemistry 2 Laboratory	2
CHEMTRI	General Chemistry 3	2
ANACHE1	Analytical Chemistry 1	3
LBYCH27	Analytical Chemistry 1 Laboratory	2
ORGCHE1	Organic Chemistry 1	3
LBYCH37	Organic Chemistry 1 Laboratory	2
ORGCHE2	Organic Chemistry 2	3
LBYCH38	Organic Chemistry 2 Laboratory	2
INSMETH	Instrumental Methods of Analysis	3
LBYCH29	Instrumental Methods of Analysis Laboratory	2
BIOCHE1	Biochemistry 1	3
LBYCH47	Biochemistry 1 Laboratory	1
BIOCHE2	Biochemistry 1	3
LBYCH48	Biochemistry 2 Laboratory	1
PYSCHE1	Physical Chemistry 1	3
LBYCH57	Physical Chemistry 1 Laboratory	1
PYSCHE2	Physical Chemistry 2	3
LBYCH58	Physical Chemistry 2 Laboratory	1
PYSCHE3	Physical Chemistry 3	3
CHYSEMI	Chemistry Seminar	1
CHYRES1	Chemistry Research 1	2
INOCHE3	Inorganic Chemistry	3
CHEMORG	Organic Chemistry 3	3
ANACHE2	Analytical Chemistry 2	3
LBYCH28	Analytical Chemistry 2 Laboratory	1
CHYPRIN	Principles of Chemistry	3
CHYELE1	Chemistry Elective 1	3
CHYELE2	Chemistry Elective 2	3
Total		73

Practicum + Thesis

Course Code	Course Title	No. of Units
PRCCHEM	Chemistry Practicum	3
THSCHY1	ChemistryThesis 1	1
THSCHY2	ChemistryThesis 2	2
Total		6

Physics

Course Code	Course Title	No. of Units
PHYFUN1	Fundamentals of Physics 1	3
PHYFUN2	Fundamentals of Physics 2	3
PHYFUN3	Fundamentals of Physics 3	3
LBYPHY1	Fundamentals of Physics 1 (Lab)	1
LBYPHY2	Fundamentals of Physics 2 (Lab)	1
LBYPHY2	Fundamentals of Physics 3 (Lab) (BS Chem only)	1
Total		12

Mathematics

Course Code	Course Title	No. of Units
STATSCI	Statistics for Science	3
MATH111	College Algebra	3
MATH112	Trigonometry	3
KEMATH1	Calculus 1 for Chem and Biochem	3
KEMATH2	Calculus 2 for Chem and Biochem	3
KEMATH3	Calculus 3 for Chem and Biochem	3
DIFEQUA	Differential Equations	3
Total		21

Information Technology

Course Code	Course Title	No. of Units
COMCHEM	Computer for Chemistry Majors	3
Total		3

Course Description (Chemistry Courses)

ANACHE1

Analytical Chemistry 1 for Chemistry and Biochemistry Majors

An introductory course in chemical analysis covering chemical principles and applications of gravimetry and of titrimetry, including acid-base, complexation, precipitation, reduction-oxidation reactions.

3 units

Pre-requisite: INOCHE2

ANACHE2

Analytical Chemistry 2 for Chemistry and Biochemistry Majors

A course covering reduction-oxidation reactions and electroanalytical methods.

3 units

Pre-requisite: ANACHE1

BIOCHE1

Biochemistry 1 for Chemistry and Biochemistry Majors

This course covers the fundamental aspects of biochemistry and structure and dynamics of important cellular components. The properties of carbohydrates, lipids and membranes, proteins and enzymes and nucleic acids, and selected methods of analysis of biomolecules are discussed.

3 units

Pre-requisite: ORGCHE2

BIOCHE2

Biochemistry 2 for Chemistry and Biochemistry Majors

This course covers topics in metabolism. The areas to be discussed include bioenergetics, the design and regulation of metabolic pathways and specific molecular processes involved in the synthesis and degradation of major cellular components—the carbohydrates, lipids, proteins and nucleic acid.

3 units

Pre-requisite: BIOCHE1

CHEMORG

Organic Chemistry 3

A lecture course covering advanced topics in organic chemistry with emphasis on molecular orbitals and spectroscopic techniques

3 units

Pre-requisite: ORGCHE2

CHEMTRI

General Chemistry 3

This course is intended to take the Chemistry major into a deeper discussion of chemical bonding (valence bond and molecular orbital theories), solids, and solutions beyond the level of INOCHE1. It serves as an introduction to

nuclear chemistry and applies the concepts and principles learned in General Chemistry to the environment, particularly the atmosphere

2 units

Pre-requisite: INOCHE1

CHYPRIN

Principles of Chemistry

This course is an integration of basic and advance principles of inorganic, organic, analytical, physical chemistry and biochemistry

3 units

Prerequisite: ORGCHE2, INSMETH, PYSICHE2

CHYRES1

Chemistry Research 1

CHYRES1 is a course designed to prepare students to undertake research in chemistry. It is devoted to the conceptualization, organization and planning of an original project in chemistry. It seeks to familiarize the student with the chemical literature as well as with legal and social issues confronting researches, ethics, and conduct of research, intellectual property rights, scientific writing. The course requirements include the submission of a research proposal.

2 units

Pre-requisite: 20 units of Chemistry

CHYSEMI

Chemistry Seminar

CHYSEMI is a course for BS Chemistry/BS Major in Chemistry/ BS Biochemistry students. It is designed to help the student to develop an awareness of recent developments in the field by attending and actively participating in chemistry seminars. The course seeks to train the students to present result, conclusion and views in public. The student in CHYSEMI is required to present a seminar on a chosen topic, attend the department seminars and prepare reaction papers.

1 unit

Pre-requisite: 20 units of Chemistry

INOCHE1

General Chemistry 1 for Chemistry and Biochemistry Majors

INOCHE1 is the first course in general and inorganic chemistry. It develops in the student basic concepts of matter and its classifications; mass relationships in chemical reactions; the properties of gases, liquids, and solids; some concepts of thermochemistry; quantum theory and electronic behavior; periodic relationship of elements in the periodic table; chemical bonding; intramolecular forces; and solutions.

3 units

INOCHE2

General Chemistry 2 for Chemistry and Biochemistry Majors

A continuation of General Chemistry 1 covering elementary chemical thermodynamics, chemical equilibrium, acid-base theories and applications, reduction-oxidation reactions, and kinetics.

3 units

Pre-requisite: INOCHE1

INOCHE3

Inorganic Chemistry

This-course is devoted to the study of a selection of topics in inorganic chemistry specifically those not covered in INOCHE1 and INOCHE2. The course focuses on the study of the chemistry of main group elements as well as metals and metallurgy. It also serves as an introduction to the chemistry of transition metals and coordination compounds. Finally, the course introduces the student to new and modern materials including liquid crystals and ceramics

3 units

Pre-requisite: INOCHE2

INSMETH

Instrumental Methods of Chemical Analysis

A course covering the principles, applications, techniques, scope, and limitations of spectroscopic methods (UV-vis, IR, Raman, AA, MS, NMR, and emission), and chromatographic methods (GC, HPLC).

3 units

Pre-requisite: ANACHE1

Co-requisite: Instrumental Methods of Chemical analysis

LBYCH17

General Chemistry Laboratory 1 for Chemistry and Biochemistry Major

A course developing basic laboratory skills. It includes experiments and exercises illustrating the concepts covered in General Chemistry 1. A more detailed discussion of topics not extensively covered in the lecture is provided through additional experiments and exercises

2 units

Co-requisite: INOCHE1

LBYCH18

General Chemistry Laboratory 2 for Chemistry and Biochemistry Major

A continuation of General Chemistry Laboratory 1. Experiments and exercises to supplement General Chemistry 2 are included. The second part of the course deals with the qualitative analysis of cations and anions.

2 units

Pre-requisite: INOCHE1, LBYCH17

Co-requisite: INOCHE2

LBYCH27

Analytical Chemistry Laboratory 1

This course encompasses a comprehensive approach in technical analysis, Chemometrics, instrumental analysis and sample handling. The course is designed to hone the technical skills of the Chemistry majors through the incorporation of actual industrial laboratory analysis and research

2 units

Pre-requisite: INOCHE2, LBYCH18

Co-requisite: ANACHE1

LBYCH28

Analytical Chemistry Laboratory 2

This course encompasses a comprehensive approach in technical analysis, Chemometrics, instrumental analysis and sample handling. The course is designed to hone the technical skills of the Chemistry majors through the incorporation of actual industrial laboratory analysis and research.

2 units

Pre-requisite: ANACHE1, LBYCH27

Co-requisite: ANACHE2

LBYCH29

Instrumental Methods of Analysis Laboratory

A series of experiments on chemical analysis using spectroscopic methods (UV-Vis, IR, AA, GC-MS and emission), chromatographic (GC, HPLC) and electrochemical methods.

2 units

Pre-requisite: ANACHE1, LBYCH27

Co-requisite: INSMETH

LBYCH37

Organic Chemistry Laboratory 1

An organic laboratory course designed to develop skills and techniques in handling organic compounds. The laboratory course concentrates on the isolation and purification of organic compounds, and on classical organic analysis.

2 units

Pre-requisite: LBYCH17

Co-requisite: ORGCHE1

LBYCH38

Organic Chemistry Laboratory 2

A series of experiments which deal with various types of organic reactions and their application in organic synthesis.
2 units

Pre-requisite: LBYCH37

Co-requisite: ORGCHE2

LBYCH47

Biochemistry Laboratory 1

This laboratory course is designed to introduce students to the qualitative and quantitative study of carbohydrates, proteins, lipids, and nucleic acids. It also covers Isolation and characterization, as well as the molecular modeling of selected biomolecules.

1 unit

Prerequisite: ORGCHE2 and LBYCH37

Corequisite: BIOCHE1

LBYCH48

Biochemistry Laboratory 2

This course introduces Chemistry and Biochemistry Majors with some contemporary tools used in biochemistry and molecular biology.

1 unit

Prerequisite: BIOCHE1 and LBYCH47

Corequisite: BIOCHE2

LBYCH57

Physical Chemistry Laboratory 1

A laboratory course covering experiments illustrating thermodynamic principles.

1 unit

Prerequisite: PYSICHE1

LBYCH58

Physical Chemistry Laboratory 2

A laboratory course that includes experiments in electrochemistry, thermodynamics, polymer properties, and chemical equilibria.

1 unit

Prerequisite: PSYCHE2 and LBYCH57

ORGCHE1

Organic Chemistry 1 for Chemistry and Biochemistry Majors

This lecture course includes a review of basic principles, nomenclature, as well as structure and reactive sites of organic molecules. It also discusses the different forms of isomerism, the conformations and configurations of organic compounds. The course also covers the physical and chemical properties of alkanes, alkyl halides, alkenes, and alkynes.

3 units

Prerequisite: INOCHE2

ORGCHE2

Organic Chemistry 2 for Chemistry and Biochemistry Majors

A lecture course covering the structure, nomenclature, physical properties, preparation and chemical properties of alkyl halides, aromatic compounds, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, carboxylic acid derivatives and amines.

3 units

Prerequisite: ORGCHE1

PYSCHE1

Physical Chemistry 1

This course encompasses properties of gases, the concept of temperature, and the laws of thermodynamics and their applications to simple systems such as gases.

3 units

Prerequisite: INOCHE2, MATH114, PHYFUN1

PYSCHE2

Physical Chemistry

The course is devoted to the study of chemical and physical equilibria, solutions of electrolytes, kinetics, surface phenomena and transport property. The student will be introduced to the qualitative and quantitative treatments of these concepts.

3 units

Prerequisite: PYSCHE1

PYSCHE3

Physical Chemistry 3

The course serves as a first introduction for the senior undergraduate chemistry major to quantum chemistry. The course traces the development of the atomic theory, to quantum theory. The concepts and postulates of quantum mechanics are introduced and illustrated using simple systems including the particle in a box, the Hydrogen atom, the Helium atom, the Hydrogen molecule ion and the Hydrogen molecule.

3 units

Prerequisite to: Differential Equations

Chemistry Elective Subjects (for CHYELE1 and CHYELE2)**BCHELE1****Biochemistry Elective 1: Special Topics in Biochemistry 1**

Part I focuses on the molecular principles to explain the structure, function, dynamics and bioenergetics of biological membranes. Part II deals with the molecular basis of selected diseases and drug therapy.

3 units

Pre-requisite: BIOCHE1

BCHELE2

Biochemistry Elective 2: Special Topics in Biochemistry 2

Part 1 is a brief introduction to the biochemistry of foods of plant origin. The course is designed to give students a basic understanding of the biochemical components of plant foods and the changes that occur during the processing of specific food types. Part 2 of the course aims to present an overview of plant biochemistry to include discussions of photosynthesis, carbohydrate metabolism, nitrogen fixation, reduction and assimilation

3 units

Pre-requisite: BIOCHE1

CARBCEM

Carbohydrate Chemistry

The scope of this course includes the analysis and characterization of the structure of simple and complex monosaccharides, oligosaccharides and polysaccharides, including sequence, linkages, configuration, conformation, functional groups, polymerization, derivatization and degradation. Important pathways in carbohydrate metabolism in prokaryotes, plants and animals are also discussed.

3 units

Pre-requisite: ORGCHE2

CHEENVI

Chemistry of the Environment

A course covering environmental problems, pertaining to air, water, the earth, and life. Chemical concepts are applied in the evaluation of environmental threats to the earth and the biosphere.

3 units

Pre-requisite: INOCHE2

CHEMANA

Chemical Analysis for Chemistry Students (CHEMANA)

A course in methods and technical analysis which deals on analytical methods, methods validation, trace analysis, gravimetry and combustion analysis.

3 units

Pre-requisite: ANACHE1

CHMFOOD

Food Chemistry

This course is designed to present a unified picture of foods from a chemical standpoint. Emphasis is given to the major constitutions of foods and the chemical changes that occur when they are subjected to processing.

3 units

Pre-requisite: BIOCHE1

CHEMPOL

Polymer Chemistry

The course deals primarily with synthetic polymers. It covers concepts on polymer synthesis and how it relates to polymer properties and applications.

3 units

Prerequisite: ORGCHE2

PYSBIOL

Physical Biochemistry

This course focuses on the basic principles of quantitative and physical biochemistry. Topics include acid-base balance, bioenergetics, enzyme catalysis, and techniques used to determine the structure of biomolecules.

3 units

Prerequisite: BIOCHE2

Thesis and Practicum Subjects**THSCHY1**

Chemistry Thesis 1

Development of research topic proposed in CHYRES1 through experimentation.

1 unit

THSCCHY2

Chemistry Thesis 2

A continuation of THSCHY1. The oral presentation and the submission of the written scientific report.

2 units

PRCCHEM

Chemistry Practicum

Practicum course for Chemistry and Biochemistry Majors

3 units