COURSES INFORMATION FOR THE BSC. CHEMISTRY

BSc CHEMISTRY

LEVEL I (24 CREDITS)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry

AND 12 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (18 Credits)

CHEM2700 Intermediate Inorganic Chemistry
CHEM2705 Intermediate Organic Chemistry
CHEM2710 Intermediate Physical Chemistry
CHEM2715 Laboratory Methods in Chemistry I
CHEM2720 Laboratory Methods in Chemistry II
CHEM2730 Quantitative Chemical Analysis

LEVEL III (3 Credits)

CHEM3625 Laboratory Methods in Chemistry III

AND 6 Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND 3 Credits from:

CHEM3630 Methods in Instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1006 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Economy, Governance and Society

*A student may substitute one of these with a Foreign Language course.

LEVEL I CHEMISTRY COURSES

CHEM1110 - INTRODUCTION TO ORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course covers the basic and fundamental principles of organic chemistry and exposes students to the concepts of chemical bonding in organic molecules, functional groups, nomenclature, stereochemistry and reaction mechanisms. Electron pushing formalism will be emphasized in an attempt to discourage rote learning and to allow students to better understand the language of organic chemistry. Students will be expected to apply their knowledge to interpret reactions based on their patterns of reactivity and hence predict and explain unknown reactions.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1120 - INTRODUCTION TO PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to provide students with knowledge of the fundamental principles of physical chemistry with an emphasis on thermodynamics, energetics, chemical kinetics, electrochemistry and the fundamentals of spectroscopy. The aim is to provide 1st year (i.e. fully matriculated) students with a theoretical foundation for the more advanced and specialised 2nd and 3rd year physical chemistry courses.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1125 - INTRODUCTION TO EXPERIMENTAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course is a yearlong 3-credit experimental chemistry course with 84 hours of experimental work in which students are exposed to concepts and laboratory skills associated with Organic, Inorganic, Analytical and Physical Chemistry. Students will hone their critical thinking and analytical skills through a series of discussions and experiments designed to improve experimental skills and prepare them for more advanced laboratory techniques.

Teaching: Seven-six (76) hours for practical skills and eight (8) hours for data analysis skill set.

Method of Examination:

Coursework: 100%

CHEM1130 - INTRODUCTION TO INORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to equip biological and chemical sciences students with knowledge of the fundamental principles of inorganic chemistry including atomic and molecular structures and properties, the chemistry of the main group and transition elements, including industrial and commercial applications, coordination compounds and the packing arrangements of ionic structures. These areas will be used as the basis for advanced inorganic chemistry courses required for the major/minor in chemistry.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

***NOTE: Twelve (12) Level I Credits from any Faculty also to be completed.**

LEVELS II CHEMISTRY COURSES

CHEM2700 – INTERMEDIATE INORGANIC CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1125 Introduction to Experimental Chemistry AND

CHEM1130 Introduction to Inorganic Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course seeks to build on the fundamental Inorganic Chemistry knowledge that the students were exposed to in their first year by, amongst others, introducing the transition metals and their utility in industry related to their chemical and physical properties. The students are also exposed to spectroscopic and magnetochemical analysis used in the characterization of transition metal complexes.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2705 - INTERMEDIATE ORGANIC CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1110 Introduction to Organic Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course introduces students to the utilization of spectroscopic techniques in elucidating the structure of organic molecules, advanced organic stereochemistry, properties of aromatic molecules, electrophilic aromatic substitution, enolate chemistry, and several other reaction classes. They will learn how to predict the expected outcome of reactions, craft reaction mechanisms and determine the structure of organic molecules while reinforcing concepts learnt, and skills cultivated in the first year Organic Chemistry course.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2710 - INTERMEDIATE PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1120 Introduction to Physical Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course looks at the thermodynamics, adsorption processes at solid surfaces as well as electrochemistry and aims to build on the physical chemistry fundamental knowledge that the students were exposed to in their first year. This course would help to deepen the students' understanding of the microscopic and macroscopic behaviour of matter.

Teaching: Two lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2715 - LABORATORY METHODS IN CHEMISTRY I (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2720 - LABORATORY METHODS IN CHEMISTRY II (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2730 - QUANTITATIVE CHEMICAL ANALYSIS (3 Credits)

Pre-requisite:

CHEM1120 Introduction to Physical Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course intends to build the foundations of good analytical laboratory practices by introducing the statistical methods applicable to analytical measurements, sampling techniques and methodology. The course discusses the instrumental methods of analysis including basic instrumentation and principles of spectroscopic methods viz. UV/Visible spectroscopy, fundamentals of Atomic Absorption Spectroscopy and Atomic Emission Spectroscopy. The course also looks at the use of electrochemical methods and chromatographic methods (GC, HPLC) for quantitative chemical analysis.

Teaching: Three lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

LEVELS III CHEMISTRY COURSES

CHEM3625 – LABORATORY METHODS IN CHEMISTRY III (3 Credits)

Pre-requisites:

CHEM2715 Laboratory Methods in Chemistry I OR CHEM2010 Practical Chemistry I

AND

CHEM2720 Laboratory Methods in Chemistry II OR CHEM2020 Practical Chemistry II

Syllabus: This laboratory course is one in which final year students in Chemistry are exposed to concepts and techniques associated with, but not limited to Analytical, Bioinorganic, Bioorganic/Medicinal, Environmental, Inorganic, Organic, and Physical Chemistry. This course primarily seeks to further build on practical theory and techniques acquired during Level II and will equip students with advanced chemistry practical skills. It also seeks to reinforce the principles of laboratory safety that will place the students in good stead for graduate work or future careers. This laboratory experience provides opportunities for learners to develop their skills in making observations, taking measurements, designing experiments, communicating their data, results and conclusions, improving their scientific, information, numeracy and general literacy skills. The course comprises a series of experiments designed to illustrate important preparative reactions, characterization and analytical techniques.

Teaching: Six practical hours per week.

Method of Examination:

Coursework 100%

CHEM3167 – ADVANCED INORGANIC CHEMISTRY (3 Credits)

Prerequisites:

CHEM2700 Intermediate Inorganic Chemistry OR CHEM2100 Inorganic Chemistry I

OR

CHEM2115 Main Group Chemistry AND CHEM3115 Transition Metal Chemistry I

Restriction: Not to be taken if student has passed CHEM3100 Inorganic Chemistry II.

Syllabus: This final year inorganic chemistry course covers topics in the applications of group theory to problems in bonding and spectroscopy, the application of physical techniques used to study inorganic systems and the organometallic chemistry of main group and transition elements. It is directed at students at the advanced level of learning and will build on knowledge gained in the prerequisite course(s). It will provide students with a good foundation for graduate work in the fields of inorganic/metalloorganic and materials chemistry.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3175 – ADVANCED ORGANIC CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2705 Intermediate Organic Chemistry

OR

CHEM2200 Organic Chemistry I OR CHEM2215 Basic Organic Chemistry

Restriction: Not to be taken if student has passed CHEM3200 Organic Chemistry II.

Syllabus: This level III course of 24 lecture hours and associated tutorials emphasizes the importance of organic reaction mechanisms, giving special emphasis to the techniques used in the elucidation of a reaction pathway. It is further supplemented by an investigation into the properties of key organic reaction intermediates, an introduction to the principles of synthetic strategy and retrosynthetic analysis, in addition to a presentation of the essential classes of pericyclic reactions. Case studies taken from synthetic journal articles will be used to highlight the utility of particular reactions in the synthesis of important natural products and drug targets.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3620 - ADVANCED PHYSICAL CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2710 Intermediate Physical Chemistry

OR

CHEM2300 Physical Chemistry I

OR

CHEM2315 Physical Chemistry II

Restriction: Not to be taken if student has passed CHEM3300 Physical Chemistry II.

Syllabus: This elective addresses topics in statistical thermodynamics, the thermodynamics of liquid surfaces, physical methods applied to molecular weight determination of polymers, and theoretical aspects of chemical kinetics and mechanisms. This course requires a solid foundation in basic mathematics, as well as calculus. The aim of this course is to build on the foundations laid by the first-year Introductory Physical Chemistry course and the second-year Intermediate Physical Chemistry course in order to deepen students' understanding of the behaviour of matter at the macroscopic level. It is an elective for students pursuing a Major in Chemistry. It is applicable to students who wish to enhance their understanding of physical chemistry.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3630 – METHODS IN INSTRUMENTAL ANALYSIS (3 Credits)

Pre-requisites:

CHEM2730 Quantitative Chemical Analysis

OR

CHEM2400 Analytical Chemistry I

Restriction: Not to be taken if student has passed CHEM3415 Analytical Chemistry III.

Syllabus: This course focuses on the implementation of advanced instrumental techniques and their applications in analytical chemistry. It discusses the instrumental techniques and method development of analysis including chromatographic methods Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC), and electrophoresis. The operating principles and practices of some of the more chemically important instruments, such as FTIR and Mass spectrometers will also be discussed. Students will engage in problem-based activities that will help to develop their skills in the use and interpretation of statistical data using typical analytical methods: calibration curves, weighted and unweighted regression lines and ANOVA. Detailed descriptions of the electro-analytical techniques such as cyclic voltammetry and polarography are also included.

Teaching: Eighteen lecture hours, six tutorial hours and twenty-four laboratory hours per semester.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	25%
Practical	25%

CHEM3218 – ENVIRONMENTAL CHEMISTRY AND TOXICOLOGY (3 Credits)

Pre-requisites: CHEM2725 Chemistry of the Environment OR CHEM3515 Environmental Chemistry

Syllabus: This course explores the analysis and impact of pollutants in the environment with a focus on their toxicological effects on organisms including man. Fundamental concepts in environmental chemistry and toxicology will be reviewed and applied to a variety of chemicals/environmental issues, such as toxic metals, persistent organic pollutants, emerging chemicals of concern, as well as environmental forensics.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

NOTE: STUDENTS WISHING TO PURSUE CHEM3218 – ENVIRONMENTAL CHEMISTRY AND TOXICOLOGY SHOULD ENSURE THAT THEY HAVE THE RELEVANT LEVEL II PREREQUISITE COURSE: CHEM2725 –CHEMISTRY OF THE ENVIONMENT:

CHEM2725 - CHEMISTRY OF THE ENVIRONMENT (3 Credits)

Prerequisites:

CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Restriction: Not to be taken if student has passed CHEM3515 Environmental Chemistry.

Description: An understanding of the fundamental chemical processes in the environment is critical to understanding the world in which we live and our impact on it. Students will develop knowledge and skills that will allow them to contribute to regional needs related to air, water and soil quality. This course is required for the double major in chemistry and is an elective course that contributes to the minor in Environmental Science

Teaching: Three interactive lectures/tutorials per week.

Method of Examination:

Theory: Final Examination (2 hours) 50%

Theory: In-course Test(s)/Assignment(s) 50%

***NOTE: Thirty (30) Levels II and III credits from any Faculty also to be completed. Three (3) of those credits can come from a Co-Curricular course.**

FOUNDATION COURSES INFORMATION

FOUN 1006 EXPOSITION FOR ACADEMIC PURPOSES (3 Credits)

This course is designed to: (1) equip students with the study and research skills they will need in order to get the maximum benefit from all their courses at the University; (2) familiarize them with the linguistic situation in the Caribbean and break down common misconceptions they usually have about it; (3) introduce students to the rhetorical modes of discourse; and (4) develop skill in critical thinking and reading.

(Cannot be taken with FOUN1008)

FOUN 1008 AN INTRODUCTION TO PROFESSIONAL WRITING (3 Credits)

This course is designed to help students develop skills common to all professional, workplace-oriented writing, whether in business or science.

(Cannot be taken with FOUN1006)

FOUN 1101 CARIBBEAN CIVILIZATION (3 Credits)

This course is designed to develop an awareness of the main process of cultural development in Caribbean societies, highlighting the factors, the problematics and the creative output that have fed the emergence of Caribbean identities; to develop a perception of the Caribbean as wider than island nations or linguistic blocs; to stimulate students' interest in, and commitment to Caribbean civilization and to further their self-determination.

FOUN 1301 LAW, GOVERNANCE, ECONOMY AND SOCIETY (3 Credits)

This is a multi-disciplinary course of the Faculty of Social Sciences which is designed mainly for non-Social Sciences students. The course will introduce students to some of the major institutions in Caribbean society. It will expose them to both historical and contemporary aspects of Caribbean society, including Caribbean legal, political and economic systems. In addition, Caribbean culture and Caribbean social problems are discussed.

REPLACING A FOUNDATION COURSE WITH A FOREIGN LANGUAGE COURSE

Students in the Faculty of Science and Technology may replace FOUN1101 Caribbean Civilization OR FOUN1301 Law, Governance, Economy and Society with a foreign language course in French, Spanish, Portuguese or Chinese. Students seeking to do such should notify the faculty office via use of Foundation Course Substitution Form on the student resources page of the faculty website.

COURSES INFORMATION FOR THE BSC. CHEMISTRY (DOUBLE)

BSc CHEMISTRY (DOUBLE)

LEVEL I (24 CREDITS)

CHEM1110 Introduction to Organic Chemistry

CHEM1120 Introduction to Physical Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1130 Introduction to Inorganic Chemistry

AND 12 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (18 Credits)

CHEM2700 Intermediate Inorganic Chemistry

CHEM2705 Intermediate Organic Chemistry

CHEM2710 Intermediate Physical Chemistry

CHEM2715 Laboratory Methods in Chemistry I

CHEM2720 Laboratory Methods in Chemistry II

CHEM2730 Quantitative Chemical Analysis

LEVEL III (12 Credits)

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

CHEM3625 Laboratory Methods in Chemistry III

AND Thirty (30) credits from:

CHEM2513 Fundamentals of Teaching Chemistry

CHEM2725 Chemistry of the Environment

CHEM3630 Methods in Instrumental Analysis

CHEM3635 Biological Inorganic Chemistry

CHEM3218 Environmental Chemistry and Toxicology

CHEM3800 Nanostructures and Supramolecular Chemistry

CHEM3955 Research Project in Chemistry (6 cr)

CHEM3990 Professional Placement for Chemists**

CHEM3992 Special Topics in Physical Chemistry

BIOC2365 Primary Metabolism

OR ENSC2000 Essentials of Oceanography***

OR ENSC2003 Sustainable Energy Systems

AND 9 CREDITS: FOUNDATION COURSES

FOUN1006 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Economy, Governance and Society

*A student may substitute one of these with a Foreign Language course.

**Offered in summer only.

***Students wishing to pursue this elective should ensure that they have the relevant Level I prerequisite courses:

METE1110 Introduction to Ocean and Climate

OR ERSC1000 Earth and its Environment

OR METE1200 Oceans and Climate

LEVEL I CHEMISTRY COURSES

CHEM1110 - INTRODUCTION TO ORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course covers the basic and fundamental principles of organic chemistry and exposes students to the concepts of chemical bonding in organic molecules, functional groups, nomenclature, stereochemistry and reaction mechanisms. Electron pushing formalism will be emphasized in an attempt to discourage rote learning and to allow students to better understand the language of organic chemistry. Students will be expected to apply their knowledge to interpret reactions based on their patterns of reactivity and hence predict and explain unknown reactions.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1120 - INTRODUCTION TO PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to provide students with knowledge of the fundamental principles of physical chemistry with an emphasis on thermodynamics, energetics, chemical kinetics, electrochemistry and the fundamentals of spectroscopy. The aim is to provide 1st year (i.e. fully matriculated) students with a theoretical foundation for the more advanced and specialised 2nd and 3rd year physical chemistry courses.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1125 - INTRODUCTION TO EXPERIMENTAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course is a yearlong 3-credit experimental chemistry course with 84 hours of experimental work in which students are exposed to concepts and laboratory skills associated with Organic, Inorganic, Analytical and Physical Chemistry. Students will hone their critical thinking and analytical skills through a series of discussions and experiments designed to improve experimental skills and prepare them for more advanced laboratory techniques.

Teaching: Seven-six (76) hours for practical skills and eight (8) hours for data analysis skill set.

Method of Examination:

Coursework: 100%

CHEM1130 - INTRODUCTION TO INORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to equip biological and chemical sciences students with knowledge of the fundamental principles of inorganic chemistry including atomic and molecular structures and properties, the chemistry of the main group and transition elements, including industrial and commercial applications, coordination compounds and the packing arrangements of ionic structures. These areas will be used as the basis for advanced inorganic chemistry courses required for the major/minor in chemistry.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

***NOTE: Twelve (12) Level I Credits from any Faculty also to be completed.**

LEVELS II CHEMISTRY COURSES

CHEM2700 – INTERMEDIATE INORGANIC CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1125 Introduction to Experimental Chemistry AND

CHEM1130 Introduction to Inorganic Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course seeks to build on the fundamental Inorganic Chemistry knowledge that the students were exposed to in their first year by, amongst others, introducing the transition metals and their utility in industry related to their chemical and physical properties. The students are also exposed to spectroscopic and magnetochemical analysis used in the characterization of transition metal complexes.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2705 - INTERMEDIATE ORGANIC CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1110 Introduction to Organic Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course introduces students to the utilization of spectroscopic techniques in elucidating the structure of organic molecules, advanced organic stereochemistry, properties of aromatic molecules, electrophilic aromatic substitution, enolate chemistry, and several other reaction classes. They will learn how to predict the expected outcome of reactions, craft reaction mechanisms and determine the structure of organic molecules while reinforcing concepts learnt, and skills cultivated in the first year Organic Chemistry course.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2710 - INTERMEDIATE PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite:

CHEM1120 Introduction to Physical Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course looks at the thermodynamics, adsorption processes at solid surfaces as well as electrochemistry and aims to build on the physical chemistry fundamental knowledge that the students were exposed to in their first year. This course would help to deepen the students' understanding of the microscopic and macroscopic behaviour of matter.

Teaching: Two lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM2715 - LABORATORY METHODS IN CHEMISTRY I (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2720 - LABORATORY METHODS IN CHEMISTRY II (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2730 - QUANTITATIVE CHEMICAL ANALYSIS (3 Credits)

Pre-requisite:

CHEM1120 Introduction to Physical Chemistry AND CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Syllabus: This course intends to build the foundations of good analytical laboratory practices by introducing the statistical methods applicable to analytical measurements, sampling techniques and methodology. The course discusses the instrumental methods of analysis including basic instrumentation and principles of spectroscopic methods viz. UV/Visible spectroscopy, fundamentals of Atomic Absorption Spectroscopy and Atomic Emission Spectroscopy. The course also looks at the use of electrochemical methods and chromatographic methods (GC, HPLC) for quantitative chemical analysis.

Teaching: Three lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

LEVELS III CHEMISTRY COURSES

CHEM3167 – ADVANCED INORGANIC CHEMISTRY (3 Credits)

Prerequisites:

CHEM2700 Intermediate Inorganic Chemistry OR CHEM2100 Inorganic Chemistry I

OR

CHEM2115 Main Group Chemistry AND CHEM3115 Transition Metal Chemistry I

Restriction: Not to be taken if student has passed CHEM3100 Inorganic Chemistry II.

Syllabus: This final year inorganic chemistry course covers topics in the applications of group theory to problems in bonding and spectroscopy, the application of physical techniques used to study inorganic systems and the organometallic chemistry of main group and transition elements. It is directed at students at the advanced level of learning and will build on knowledge gained in the prerequisite course(s). It will provide students with a good foundation for graduate work in the fields of inorganic/metalloorganic and materials chemistry.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3175 – ADVANCED ORGANIC CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2705 Intermediate Organic Chemistry

OR

CHEM2200 Organic Chemistry I OR CHEM2215 Basic Organic Chemistry

Restriction: Not to be taken if student has passed CHEM3200 Organic Chemistry II.

Syllabus: This level III course of 24 lecture hours and associated tutorials emphasizes the importance of organic reaction mechanisms, giving special emphasis to the techniques used in the elucidation of a reaction pathway. It is further supplemented by an investigation into the properties of key organic reaction intermediates, an introduction to the principles of synthetic strategy and retrosynthetic analysis, in addition to a presentation of the essential classes of pericyclic reactions. Case studies taken from synthetic journal articles will be used to highlight the utility of particular reactions in the synthesis of important natural products and drug targets.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3620 - ADVANCED PHYSICAL CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2710 Intermediate Physical Chemistry

OR

CHEM2300 Physical Chemistry I

OR

CHEM2315 Physical Chemistry II

Restriction: Not to be taken if student has passed CHEM3300 Physical Chemistry II.

Syllabus: This elective addresses topics in statistical thermodynamics, the thermodynamics of liquid surfaces, physical methods applied to molecular weight determination of polymers, and theoretical aspects of chemical kinetics and mechanisms. This course requires a solid foundation in basic mathematics, as well as calculus. The aim of this course is to build on the foundations laid by the first-year Introductory Physical Chemistry course and the second-year Intermediate Physical Chemistry course in order to deepen students' understanding of the behaviour of matter at the macroscopic level. It is an elective for students pursuing a Major in Chemistry. It is applicable to students who wish to enhance their understanding of physical chemistry.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3625 – LABORATORY METHODS IN CHEMISTRY III (3 Credits)

Pre-requisites:

CHEM2715 Laboratory Methods in Chemistry I OR CHEM2010 Practical Chemistry I

AND

CHEM2720 Laboratory Methods in Chemistry II OR CHEM2020 Practical Chemistry II

Syllabus: This laboratory course is one in which final year students in Chemistry are exposed to concepts and techniques associated with, but not limited to Analytical, Bioinorganic, Bioorganic/Medicinal, Environmental, Inorganic, Organic, and Physical Chemistry. This course primarily seeks to further build on practical theory and techniques acquired during Level II and will equip students with advanced chemistry practical skills. It also seeks to reinforce the principles of laboratory safety that will place the students in good stead for graduate work or future careers. This laboratory experience provides opportunities for learners to develop their skills in making observations, taking measurements, designing experiments, communicating their data, results and conclusions, improving their scientific, information, numeracy and general literacy skills. The course comprises a series of experiments designed to illustrate important preparative reactions, characterization and analytical techniques.

Teaching: Six practical hours per week.

Method of Examination:

Coursework 100%

CHEM2513 – FUNDAMENTALS OF TEACHING CHEMISTRY (3 credits)

Pre-requisite:

CHEM1110 Introduction to Organic Chemistry

CHEM1130 Introduction to Inorganic Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1120 Introduction to Physical Chemistry

OR

CHEM1010 – Fundamentals of Chemistry **AND** CHEM1020 – Introductory Chemistry

Syllabus: This course seeks to expose Chemistry students, who are interested in becoming teachers, to the skills of teaching Chemistry/Science, how learning occurs as well as how to overcome some of the barriers to learning. In the process participants will further develop their critical thinking, analytical and communication skills. They will be exposed to best practice relating to scientific literacy, an inquiry based approach to Chemistry/Science as well as various teaching strategies to engage active and hence deep learning. Participants will also engage in lesson planning and microteaching.

Teaching: Three teaching hours per week.

Method of Examination:

Coursework 100%

CHEM2725 - CHEMISTRY OF THE ENVIRONMENT (3 Credits)

Prerequisites: CHEM1125 Introduction to Experimental Chemistry

OR

CHEM1010 Fundamentals of Chemistry AND CHEM1020 Introductory Chemistry

Restriction: Not to be taken if student has passed CHEM3515 Environmental Chemistry.

Description: An understanding of the fundamental chemical processes in the environment is critical to understanding the world in which we live and our impact on it. Students will develop knowledge and skills that will allow them to contribute to regional needs related to air, water and soil quality. This course is required for the double major in chemistry and is an elective course that contributes to the minor in Environmental Science

Teaching: Three interactive lectures/tutorials per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3630 – METHODS IN INSTRUMENTAL ANALYSIS (3 Credits)

Pre-requisites: CHEM2730 Quantitative Chemical Analysis OR CHEM2400 Analytical Chemistry I

Restriction: Not to be taken if student has passed CHEM3415 Analytical Chemistry III.

Syllabus: This course focuses on the implementation of advanced instrumental techniques and their applications in analytical chemistry. It discusses the instrumental techniques and method development of analysis including chromatographic methods Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC), and electrophoresis. The operating principles and practices of some of the more chemically important instruments, such as FTIR and Mass spectrometers will also be discussed. Students will engage in problem-based activities that will help to develop their skills in the use and interpretation of statistical data using typical analytical methods: calibration curves, weighted and unweighted regression lines and ANOVA. Detailed descriptions of the electro-analytical techniques such as cyclic voltammetry and polarography are also included.

Teaching: Eighteen lecture hours, six tutorial hours and twenty-four laboratory hours per semester.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	25%
Practical	25%

CHEM3635 – BIOLOGICAL INORGANIC CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2700 Intermediate Inorganic Chemistry

OR

CHEM2100 Inorganic Chemistry I

OR

CHEM2115 Main Group Chemistry

AND

CHEM3115 Transition Metal Chemistry I

Restriction: Not to be taken if student has passed CHEM3135 Bioinorganic Chemistry.

Syllabus: This course is intended for final year chemistry and biochemistry students who wish to cement their knowledge regarding the chemistry of biological molecules. The course will provide students with a general overview of the many fundamental tasks performed by inorganic elements in living organisms as well as the related methods and theories. It focuses on the application of principles of inorganic chemistry to the understanding of biological function at the molecular level. Topics covered include spectroscopic methods in chemical biology, metal ion acquisition & speciation in biological systems, metalloenzymes in metabolism and synthesis, role of metals in diseased states and metal containing pharmaceuticals.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM3218 – ENVIRONMENTAL CHEMISTRY AND TOXICOLOGY (3 Credits)

Pre-requisites:

CHEM2725 Chemistry of the Environment

OR

CHEM3515 Environmental Chemistry

Syllabus: This course explores the analysis and impact of pollutants in the environment with a focus on their toxicological effects on organisms including man. Fundamental concepts in environmental chemistry and toxicology will be reviewed and applied to a variety of chemicals/environmental issues, such as toxic metals, persistent organic pollutants, emerging chemicals of concern, as well as environmental forensics.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3800 – NANOSTRUCTURES AND SUPRAMOLECULAR CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2700 Intermediate Inorganic Chemistry **OR** CHEM2100 Inorganic Chemistry I

AND

CHEM2705 Intermediate Organic Chemistry **OR** CHEM2200 Organic Chemistry I

Syllabus: This course is intended for final year chemistry and biochemistry students and develops the concepts of supramolecular chemistry (both organic and metal-based systems) and its applications. The course will focus on the general basic and theoretical background of supramolecular chemistry concepts and terminology, and on key intermolecular interactions; supramolecular chemistry of living organisms illustrated using representative natural systems; analytical methods, utilized in supramolecular chemistry and concepts of supramolecular design.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3955 - RESEARCH PROJECT IN CHEMISTRY (6 Credits)

Pre-requisites:

CHEM2700 Intermediate Inorganic Chemistry **OR** CHEM2100 Inorganic Chemistry I

CHEM2705 Intermediate Organic Chemistry **OR** CHEM2200 Organic Chemistry I

CHEM2710 Intermediate Physical Chemistry **OR** CHEM2300 Physical Chemistry I

CHEM2730 Quantitative Chemical Analysis **OR** CHEM2400 Analytical Chemistry I

CHEM2715 Laboratory Methods in Chemistry I **OR** CHEM2010 Practical Chemistry I

CHEM2720 Laboratory Methods in Chemistry II **OR** CHEM2020 Practical Chemistry II

Restrictions: For Chemistry Double Majors only or with permission of the Department. Not to be taken if student has passed CHEM3505 Chemistry Research Project. Not to be taken with CHEM3950 Basic Project in Chemistry, BIOC3990 Biochemistry Project, BIOL3990 Biology Project, ECOL3990 Ecology Project, MICR3990 Microbiology Project or ENSC3900 Research Project in Environmental Science.

Description: This course consists of a yearlong research project for students pursuing a chemistry double major under the supervision of a member of staff. It is meant to provide the necessary training and skill development in the different areas of chemistry and comprises at least 138 hours of laboratory and/or computational work, and six (6) hours of orientation workshops, including library session (literature search), scientific report (word processing, Excel) and presentation (Power Point) preparation.

Method of Examination:

Supervisor's Assessment	15%
Seminar	15%
Project Report	70%

CHEM3990 – PROFESSIONAL PLACEMENT FOR CHEMISTS (3 Credits)

Pre-requisites:

CHEM2700 Intermediate Inorganic Chemistry **OR** CHEM2100 Inorganic Chemistry I

CHEM2705 Intermediate Organic Chemistry **OR** CHEM2200 Organic Chemistry I

CHEM2710 Intermediate Physical Chemistry **OR** CHEM2300 Physical Chemistry I

CHEM2730 Quantitative Chemical Analysis **OR** CHEM2400 Analytical Chemistry I

CHEM2715 Laboratory Methods in Chemistry I **OR** CHEM2010 Practical Chemistry I

CHEM2720 Laboratory Methods in Chemistry II **OR** CHEM2020 Practical Chemistry II

Syllabus: The course provides a formal internship of at least 4 weeks (160 hours) duration at a private sector, public sector or non- Governmental organisation during which students undertake agreed upon activities relevant to his/her studies. They will work under the guidance of a workplace supervisor as well as an on- campus supervisor and will submit a report and make a presentation at the end of the internship. Through exposure to the working environment, students will acquire transferable skills that will be useful in any future employment sphere.

Method of Examination:

Placement Report	50%
Supervisor's Appraisal	35%
Oral Presentation	15%

CHEM3992 – SPECIAL TOPICS IN PHYSICAL CHEMISTRY (3 Credits)

Pre-requisites:

CHEM2710 Intermediate Physical Chemistry

OR CHEM2300 Physical Chemistry I

OR CHEM2315 Physical Chemistry II

Restriction: Not to be taken if student has passed CHEM3300 Physical Chemistry II.

Syllabus: This course addresses topics in advanced spectroscopy and fundamental theoretical aspects of quantum mechanics, with a brief introduction to intermolecular forces. This course requires a solid foundation in basic mathematics, as well as the calculus. The aim of this course is to build on the foundations laid by the first-year Introductory Physical Chemistry course and the second-year Intermediate Physical Chemistry in order to deepen students' understanding of the behaviour of matter at the microscopic level. It is an elective for students pursuing a major in Chemistry. It is applicable to students who wish to enhance their understanding of the fundamental principles underlying much of Chemistry.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

BIOC2365 PRIMARY METABOLISM (3 Credits)

Pre-requisites: BIOC1015 Introduction to Biochemistry (**OR** BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOC2351 Biochemistry I

Syllabus: Glycolysis and TCA cycle; emphasis on thermodynamic favourability and regulation of pathways. Catabolism of hexoses other than glucose: disaccharides, glycogen and starch. Gluconeogenesis. Biosynthesis of sucrose, starch and glycogen. Glyoxylate shunt. Pentose phosphate pathways. Photosynthetic carbohydrate synthesis. Oxidation of fatty acids in mitochondria, peroxisomes, and glyoxysomes. Oxidation of unsaturated and odd-chain fatty acids. Ketone bodies. Fatty acid biosynthesis, including long chain and unsaturated fatty acids. Overview of amino acid catabolism. Nitrogen excretion and the urea cycle. Biosynthesis of amino acids. Nitrogen fixation and assimilation. Amino acids as biosynthetic precursors. DNA replication. Protein synthesis: transcription and translation. Regulation of prokaryotic gene expression, e.g. lac operon, trp operon and eukaryotic gene expression. Selected examples of water-soluble vitamins and lipid-soluble vitamins.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical:	25%

OR ENSC2000 - ESSENTIALS OF OCEANOGRAPHY (3 Credits)

Pre-requisites:

METE1110 Introduction to Ocean and Climate

OR

ENSC1000 Earth and its Environment

OR

METE1200 Oceans and Climate

Syllabus: Oceanography is the scientific study of all aspects of the marine environment. This course is designed to provide a working knowledge of important ocean processes by integrating relevant aspects of physical, chemical and biological oceanography. It will provide the student with tools to assess information on the major geographic features of the ocean basins and their origin, the chemistry of the ocean and its role in regulating climate and productivity, the origins and dynamics of wind waves, tsunamis, tides and coastal processes, and marine pollution problems. The lectures/tutorials will focus on the description and explanation of the ocean as an integrated system, whilst wet and dry practical sessions (including field exercises) will deal with application to working scenarios to underpin the theory provided. Laboratory exercises will emphasize problem solving, and data analysis and interpretation, leading to a working knowledge of oceanographic processes.

Teaching: Twenty-four (24) hours of lectures/tutorials; twenty-four (24) hours of practical exercises/fieldwork.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical/field work	30%

OR ENSC2003 - SUSTAINABLE ENERGY SYSTEMS (3 Credits)

Pre-requisites: Fifteen (15) Level 1 Faculty of Science & Technology (FST) credits

Syllabus: This course is an elective on the Environmental Science minor and will provide an opportunity for students to gain an understanding of the wider implications of human interaction with our environment. This course will first explain how societies traditionally source their energy for electricity production and the impact that this is having on our environment, before providing an introduction to sustainable energy resources and the technologies that can be used to take advantage of them. At the heart of this course is a look at how a Caribbean small island state can transition from an energy system dominated by fossil fuels, towards one that is based on 100% clean, economically viable, indigenous sustainable energy sources. The subject matter for this course is interdisciplinary in nature and has been designed for all FST students. It is recommended to those students interested in pursuing careers/further study in the expanding field of sustainable energy systems.

Teaching: Twenty-four (24) lectures/tutorials and twenty-four (24) hours of practical work.

Method of Examination:

Theory: Final Examination (2 hours)	50%
In-course test(s):	25%
Laboratory report:	10%
Group presentation:	10%
Online discussion forum and field trip reports:	5%

FOUNDATION COURSES INFORMATION

FOUN 1006 EXPOSITION FOR ACADEMIC PURPOSES (3 Credits)

This course is designed to: (1) equip students with the study and research skills they will need in order to get the maximum benefit from all their courses at the University; (2) familiarize them with the linguistic situation in the Caribbean and break down common misconceptions they usually have about it; (3) introduce students to the rhetorical modes of discourse; and (4) develop skill in critical thinking and reading.

(Cannot be taken with FOUN1008)

OR

FOUN 1008 AN INTRODUCTION TO PROFESSIONAL WRITING (3 Credits)

This course is designed to help students develop skills common to all professional, workplace-oriented writing, whether in business or science.

(Cannot be taken with FOUN1006)

AND

FOUN 1101 CARIBBEAN CIVILIZATION (3 Credits)

This course is designed to develop an awareness of the main process of cultural development in Caribbean societies, highlighting the factors, the problematics and the creative output that have fed the emergence of Caribbean identities; to develop a perception of the Caribbean as wider than island nations or linguistic blocs; to stimulate students' interest in, and commitment to Caribbean civilization and to further their self-determination.

FOUN 1301 LAW, GOVERNANCE, ECONOMY AND SOCIETY (3 Credits)

This is a multi-disciplinary course of the Faculty of Social Sciences which is designed mainly for non-Social Sciences students. The course will introduce students to some of the major institutions in Caribbean society. It will expose them to both historical and contemporary aspects of Caribbean society, including Caribbean legal, political and economic systems. In addition, Caribbean culture and Caribbean social problems are discussed.

REPLACING A FOUNDATION COURSE WITH A FOREIGN LANGUAGE COURSE

Students in the Faculty of Science and Technology may replace FOUN1101 Caribbean Civilization OR FOUN1301 Law, Governance, Economy and Society with a foreign language course in French, Spanish, Portuguese or Chinese. Students seeking to do such should notify the faculty office via use of Foundation Course Substitution Form on the student resources page of the faculty website.

NOTE: STUDENTS WISHING TO PURSUE THE ELECTIVE – ENSC2000 – ESSENTIALS OF OCEANOGRAPHY SHOULD ENSURE THAT THEY HAVE THE RELEVANT LEVEL I PREREQUISITE COURSES:

METE1110 - INTRODUCTION TO OCEANS AND CLIMATE (3 Credits)

Pre-requisites: None

Restriction: Not to be taken with ERSC1002 Oceans and Climate

Co-requisites+: METE1125: Meteorological Observations and Basic Analysis

METE1130: Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

(+ for Meteorology Majors and Minors ONLY)

Syllabus: This course is intended for students wishing to gain the essentials of climatology and oceanography. It is available to scientists and non-scientists alike. The course will provide information regarding the science of climate, the structure of the oceans, and the interaction of the ocean and the atmosphere as a driver of climate. Topics to be covered include the global radiation budget; heat and moisture transfer on the earth; the composition of the ocean; the chemical composition of the ocean; and ocean circulations.

Teaching: One (1) lecture; one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
Theory: In-course Tests/Assignments	40%

OR ERSC1000 – Earth and its Environment

OR METE1200 – Oceans and Climate