



SNCC 117 General Chemistry for the Biological Sciences



1. Factual information			
Module title	SNCC 117: General Chemistry for the Biological Sciences		
Module tutor	Mary Kalamaki Ph.D.	Level	4
Module type	Taught: Lecture/guided discussion/lab	Credit value	20 (4 US)
Mode of delivery	100% face-to-face		
Notional learning hours	200 notional hours: 49.5 hrs lecture/tutorials, 32 hrs supervised lab work and reporting , 118.5 hrs guided independent study.		

2. Rationale of the module within the degree scheme/Prerequisites/other entry requirements

This is a required module for all Biology majors. It is designed to introduce biology students to the fundamental principles of chemistry.

3. Aims of the module

Describe atomic structure and how it relates to reactivity of elements. Discuss the periodic trends of elements in relation to chemical bonding and reactivity. Explain solubility, and physical properties in terms of intermolecular forces. Understand the role of thermodynamics and predict spontaneity of reactions. Measure reaction rates using experimental approaches. Describe chemical equilibria and acid base reactions in aqueous systems. Emphasize on applications of chemical principles in biological systems.

4. Pre-requisite modules or specified entry requirements

N/A

5. Is the module compensatable?

N/A

6. Are there any PSRB requirements regarding the module?

N/A

7. Intended Learning Outcomes

A. Knowledge and understanding	Programme LOs	Learning and teaching strategy
1. Describe atomic structure and chemical properties of elements and their relationship to chemical reactivity. 2. Recognize the nature of chemical bonding and molecular shape and the significance of intermolecular forces 3. Relate thermodynamics of chemical reactions to spontaneity 4. Explain chemical kinetics, chemical equilibria and measure reaction rates 5. Discuss acid base chemistry and acid base equilibria	A2, A4	Learning and Teaching Methods Depending on the delivery mode, some or all of the following Learning and Teaching methods <ul style="list-style-type: none"> ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes

B. Cognitive skills	Programme LOs	Learning and teaching strategy
1. Use and correctly apply knowledge and understanding of chemical concepts, principles and theories to problem solving.	B2	Learning and Teaching Methods Depending on the delivery mode, some or all of the following Learning and Teaching methods <ul style="list-style-type: none"> ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes		
C. Practical and professional skills	Programme LOs	Learning and teaching strategy
1. Use analytical and experimental techniques and methods in the laboratory 2. Practice data handling, processing, reporting and communication skills.	C1, C3, C4	Learning and Teaching Methods Depending on the delivery mode, some or all of the following Learning and Teaching methods <ul style="list-style-type: none"> ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes		
D. Key transferable skills	Programme LOs	Learning and teaching strategy
1. Work effectively in a group or team to design and execute experiments. 2. Practice research and analytical skills.	D1	Learning and Teaching Methods Depending on the delivery mode, some or all of the following Learning and Teaching methods <ul style="list-style-type: none"> ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

8. Indicative content.

Atoms, Ions and Molecules ;Atomic spectra and atomic structure
Atomic orbitals & electron configurations; Periodic trends; Compounds & formulas; chemical bonds; Lewis structures, resonance and formal charges; Properties of covalent bonds
Molecular shape & polarity; Valence bond theory & hybridized orbitals; molecular recognition
Types of intermolecular interactions; Trends in solubility; properties of water
Chemical reactions & stoichiometric calculations
Aqueous solutions, electrolytes, & acid/base reactions; Precipitation & redox reactions; titrations
Heat, work, & the 1st Law; enthalpy; Heat transfer; reaction calorimetry; lattice enthalpies; Spontaneity & entropy; The 2nd Law & free energy.
Osmosis, dialysis and vapor pressure, Henry's law
Kinetic molecular theory of gases; Rates of reaction & rate laws; Reaction energetics & mechanisms
Reversible reactions & equilibrium constants; Equilibrium calculations; LeChâtelier's Principle
Acid/base equilibria; Acid/base calculations
pH buffers and indicators, acid/base titrations
Indicative LAB experiments
Laboratory safety, Accuracy and precision, density, mole, mass and volume
Flame tests, Spectroscopy
VSEPR theory and the shapes of molecules
Limiting reactant and percent yield
Solubility rules
Thermochemistry
Chemical kinetics – iodine clock reaction
Equilibrium Constant - Le Chatelier's Principle
Volumetric analysis: acid base titrations

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy: All summative assessment will be written by the teaching faculty, approved by an external examiner and common learning outcomes and marking criteria will be applied to all students regarding these assessments. Module grade will be based on summative assessments listed in the Assessment Task table below. Formative assessments methods will also be used.

Formative Assessments

Short quizzes
Diagnostic tests
Pair or group work in class

Summative Assessments

Homework (set of 5 on-line homeworks)
LAB (lab reports, written, set of 9)
Midterm Exam I
Midterm Exam II
Final Exam (cumulative)

Assessment Task	Weighting	Week submitted	Grading (P / F / %)	Module Learning Outcome(s) the assessment task maps to
Homework (on-line, 1 hour, 5 homeworks)	10	Evenly distributed throughout the term	%	B1, B2, C1, C2, D1, D2

LAB (lab reports, written, 9 reports)	10	Evenly distributed throughout the term	%	C1, C2, D1, D2
Midterm Exam I (written, 1.5 hours):	25	4	%	A1, A2,
Midterm Exam II (written, 1.5 hours)	25	8	%	A3, A4
Final Exam(written, 2 hours):	30	12	%	A1, A2, A3, A4, A5

10. Teaching staff associated with the module	
Tutor's name and contact details	Contact hours
Dr Mary Kalamaki, American College of Thessaloniki email: kalamaki@act.edu	TBA
<p>Mini CV:</p> <p>Mary Kalamaki is an associate professor of Chemistry and Biotechnology. She received a Doctor of Veterinary Medicine degree from the School of Veterinary Medicine at Aristotle University of Thessaloniki, Greece. She obtained an MSc in Preventive Medicine and Public Health and an MS in Food Science - Microbiology from the University of California, CA, USA. She obtained a Ph.D. in Agricultural and Environmental Chemistry with a Designated Emphasis in Biotechnology from the University of California. Mary has over 12 years of academic teaching experience in institutions both in the US and Greece including UCD, Agricultural University of Athens, Technological Institute of Thessaloniki, Aristotle University and ACT. She has 30 publications in peer reviewed, international academic journals, books and conference proceedings with a total Impact Factor of 81.141 (2021) and over 1,100 citations. She has presented/participated in numerous national and international conferences and workshops. Moreover, she has received awards for academic excellence and scholarships from the University of California, the National Research Foundation of Greece and the Research Committee of Aristotle University, and received over 130,000 euro in research grants. Her research interests include metabolic engineering: use of genetic modification to elucidate biochemical pathways in plants, probiotics: molecular identification of microflora in probiotic drinks, and gene expression of food-borne pathogens in probiotic drinks, gut microbiome responses to nutrition interventions, and identification of genes involved in scar formation in the gingival tissue after periodontal surgery. Mary participated as an Expert at the working group on Food Safety and Quality of the Federation of Veterinarians of Europe, and she was a member of committees and advisory boards for other international organizations. She serves as a reviewer in many scientific journals in the areas of Biotechnology, Food Science and Microbiology. Apart from her academic and professional service she also has managerial experience working in the industry both in the US and Greece.</p>	

11. Key reading list			
Author	Year	Title	Publisher
Thomas R. Gilbert, Rein V. Kirss, Stacey Lowery Bretz, Natalie Foster	2022	Chemistry: An Atoms-Focused Approach Third Edition ISBN-13: 978-0393697353	Norton

Software/Tools		
Name	URL	Type (Open Source / Proprietary)
SmartWork	https://digital.wwnorton.com/atoms3	proprietary
ACTivity Learning Management System (Moodle) To Login Use the same username and password that you use to log in to ACT computers. Your computer and ACTivity account passwords are synchronized. You can change your ACTivity password by changing your computer account password using a campus computer or via Remote Access & VPN Service (https://vpn.act.edu/). If you forgot your password, you can send a reset password request using: https://forms.gle/1sYKMK2jThctUtPQ9		

12. Other indicative text (e.g. websites)
 Additional material uploaded on ACTivity.

Learning Hub
 ACT's Learning Hub offers students assistance with their writing assignments and overall development of language skills. Located on the 2nd floor of the Bissell Library, the Learning Hub also houses the Math Tutoring services, and operates on an appointment or walk-in basis throughout the academic year (<https://anatolia.libguides.com/learninghub>)

Student Services
 The college provides many services to the students, including:

- Clubs and Organizations
- Field Trips
- Food Services
- Health and Counseling Services
- Housing
- Athletics programs and Facilities
- Career Services and Guidance
- Residence Permit Support
- Service learning opportunities
- Study Abroad Advising

Most services are free to the student. For more information please refer to Undergraduate student handbook, or email: studentservices@act.edu

13. List of amendments since last (re)validation

Area amended	Details	Date Central Quality informed

GRADING SCALE

Grade Description	UK points	US Letter Grade	US point grade
Excellent	70+	A	4.0
Very Good (high)	65-69	A-	3.67
Very Good (low)	60-64	B+	3.33
Good (high)	55-59	B	3.0
Good (low)	50-54	B-	2.67
Satisfactory (high)	45-49	C+	2.33
Satisfactory (low)	40-44	C	2.0
Fail	0-39	F	0

Grade Descriptors: These descriptors outline the typical characteristics of the standard work associated with each grade.

Excellent: Superior performance; a high level of critical analysis and evaluation; incisive and original; exceptionally well researched; high quality presentation; exceptional clarity of ideas; excellent coherence and logic; trivial or very minor errors.

Very Good: Very good performance; a very good level of critical analysis and evaluation; significant originality; well researched; clarity of ideas, thoughtful and effective presentation; very coherent and logical; minor errors only.

Good: A good performance; a good level of critical analysis and evaluation; some evidence of originality; reasonably well researched; ideas generally clear and coherent; some but not significant weakness.

Satisfactory: Satisfactory performance—at least passable; acceptable level of critical analysis and evaluation; little evidence of originality; adequately researched; ideas fairly clear and coherent, though some significant weakness.

Fail: Clearly below the pass standard; lacking substance, knowledge and understanding; ideas confused and incoherent; fundamental weaknesses in most areas; fails to meet the Learning Outcomes.

NOTICE FOR ORAL PRESENTATIONS

Oral presentations are an essential component of the assessment scheme for this course as they fulfill the ability to understand and clearly present and discuss software engineering aspects regarding the team software project that students need to implement. Oral presentations allow the opportunity for students to master their communication skills, their writing and speaking ability, which necessitates interaction with their classmates who also provide their critique of the speaker's performance (structure, content, visuals and non-verbal delivery skills). When delivering oral presentations, students will be assuming the role of the instructor, i.e., 1) the students will screen share their presentations to be visible by all students, both in-class and remotely attending students, 2) the camera will point to the student(s) presenting who will be visible to both groups, in-class and remotely attending students, and 3) both in-class and remotely attending students will interact via Q&A (questions and answers).

The oral presentations will not be recorded by the institution or/and the instructors, and **will not be** stored by any means; distributed; published; uploaded; or/and disclosed to any third persons or parties.

Students, who attend both in-class and remotely, are prohibited from recording; storing by any means; distributing the online sessions, publishing; uploading; or/and disclosing to any third persons or parties the oral presentation and any related information. It should be reminded that the unlawful and unauthorized processing of personal data is prohibited by the European and Greek laws.

On grounds that are related to your particular situation, you have the right to object to the processing or restrict the processing of your personal data in regard to the oral presentation. The request must be properly justified and submitted to the course instructor.

If you have any Questions in relation to the protection of your personal data or you wish to exercise your legal rights, please contact the Data Protection Officer of Anatolia College by using the following contact details: privacy@anatolia.edu.gr

GRADING & ACADEMIC POLICIES
ASSESSMENT DEADLINES
Students must submit work by the deadlines set in the module outline. Where coursework is submitted late and there are no accepted extenuating circumstances it will be penalized in line with the following tariff: Submission within 6 working days: a 10% reduction for each working day late down to the 40% pass mark and no further. Submission that is late by 7 or more working days is refused, mark of 0. Submission after the deadline will be assumed to be the next working day. Mitigating circumstances will be evaluated by the AS&PC
Assessment of non-degree students taking OU-validated courses (e.g., Study Abroad)
Same method of assessment, i.e. only “summative” assessments determine final grade. However, since those students are not pursuing an OU degree, they are not subject to resits or second marking, and final grade is calculated as the (weighted) average of all “summative” assessments, without requirement of passing all summative assessments to pass the course.
Revised Absence Policy – Effective Fall 2019
Students are expected to attend and participate in all of their courses throughout the term, including the first week. Those who fail to do so may be administratively withdrawn from individual courses of the College. This may affect the students’ scholarship and financial aid eligibility.
Successful Attendance
A student is considered to have successfully attended a course if he/she has attended 75% of the course lectures. Thus, for a typical ACT course with 42 hours of contact time, the maximum number of absences stands at 10 hours per course. This policy applies to all ACT students, degree-seeking and Study Abroad. Please note that absences are counted on an hourly basis. Absences due to participation in school-related trips and activities may count toward this limit. Absences for any other reason cannot be excused.
ACADEMIC INTEGRITY
A student committing an act of Academic Dishonesty in a given course will receive an F (0 percentage points) in the assignment where the academic infraction took place. If a student commits an act of Academic Dishonesty for a second time in the same course, this student will receive a failing grade in that course.
Special Accommodations
If you have specific physical, psychological, or any other learning disabilities that you believe may require accommodations for this module, you should visit the Dean’s office by bringing the appropriate documentation. The Learning Hub (1st floor, Bissell Library) is staffed by experienced English faculty and you are encouraged to use its services.