

BACHELOR OF SCIENCE DEGREE (with specialisations)

Rationale of the Programme

The limited technical persons, increasing industries and increasing the demands for scientists in different sectors such as industries, education, energy, engineering etc has led to inevitable mergers of knowledge to create innovations and skills within the different sectors. The quest for total efficiency in scientific sectors vis-à-vis the current advancement in scientific technology and industries requires qualified professionals.

The focus of this programme is understanding, reasoning and improving the natural world through systematic observation, experimentation, modelling and calculation. A quality education in science from UMU will equip students with attributes that are highly valued and sought after by a diverse range of employers around the globe. The Bachelor of Science will give students the opportunity to harness the skills and knowledge necessary to make a real contribution to the global challenges facing humanity. Discipline areas will range from cutting-edge pure and applied science to new multidisciplinary fields of science. Acquiring the communication and research skills embedded throughout each major, students will be well prepared for many diverse and exciting careers.

This programme will help scientists study the nature of the universe, its properties, the life that exists within it, and the laws that govern the behaviour of all matter. The students will investigate the big issues confronting our planet including climate change, diagnosis and treatment of disease, healthy lifestyles, food sustainability, and conserving biodiversity. This will help students improve the wellbeing of our society by getting employment opportunities in the industries, business and the government. UMU has staff who are both teachers and researchers and their research will form an integral part of students' learning experience.

Programme Objectives

The objectives of this programme are:

- a. To impart research skills which can be applied in industry and other field of science and technology
- b. Students upon graduation will recognize the importance of and possess the skills necessary for life-long learning.
- c. To instil and inculcate professional and practical skills as well as creativity and innovation; the tenets necessary while conducting experiments and project work in various environmental settings.
- d. To equip students with problem-solving principles and their application to pure science related social/economic challenges.
- e. To produce graduates who are well versed in a broad range of topics in the sciences and humanities and have a broad knowledge of the sciences, with a concentration in two of the combinational sciences.
- f. To produce scientists who are prepared to further their education in graduate school and/or directly pursue productive professional careers in the private, state, federal, or educational sectors.
- g. To produce technocrats who can demonstrate possession and application of higher-level learning skills in critical thinking and problem solving as applied to science issues.
- h. To produce graduates who can effectively apply the scientific method.
- i. To produce graduates who can utilize the cross-disciplinary research literature to analyze and synthesize science issues and their socio-economic and political implications.
- j. To produce scientists who in their future careers will be able to work both on cross-disciplinary teams and function independently as specialists in a science or technical field.
- k. Students will possess practical and theoretical knowledge of computer science and software engineering sufficient to earn a living and contribute to the economic development of the region, state and nation.
- l. Demonstrate and respect the professional standards of ethics expected of computer scientists and software engineers and appreciate the social impact of computing.

Programme Learning Outcomes

By the end of this programme, students should be able to:

- Translate theoretical principles learned into practical solutions in the field of Financial Mathematics or Quantitative Finance at the work place.
- Critically analyse/appraise an investment plan before making an investment decision, based on the financial implications for the investment.
- Transfer the knowledge attained in their study area into the day-to-day ethical issues they face at their work places.
- Integrate laboratory work into theory. This will then produce graduates who are practically oriented and will be able to use acquired knowledge to solve problems in real – life situations.
- Demonstrate knowledge and understanding of specific theories, concepts and principles in statistics and its applications.
- Describe and demonstrate methods for generating, processing, interpreting and presenting information in areas of statistics, economics, physics and their applications
- Demonstrate skills required to identify, define and resolve routine problems in statistics, computer science and their applications
- Make decisions and justify those decisions in relation to the statistics tasks including research
- Demonstrate understanding of the topics that constitutes the recognized core of knowledge of different disciplines and to allow detailed specialization in advanced topics selected by students.

Program Structure

	FIRST YEAR – SEMESTER I			
Code	Course Name	Type	CH	CU
Chemistry				
CHE 1101	Basic Inorganic Chemistry	Core	45	3
CHE 1102	Basic Physical Chemistry	Core	45	3
CHE 1103	Basic Organic Chemistry	Core	45	3
Computer Science				
CSC 1101	Introduction to Information and Communication Technology	Core	60	4
CSC 1102	Computer Architecture and Organisation	Core	45	3
CSC 1103	Principles of Programming	Core	60	4
Economics				
ECO 1101	Microeconomics I	Core	60	4
ECO 1102	Introduction to Mathematics for Economists	Core	60	4
Mathematics				
MTC 1101	Calculus I	Core	45	3
MTC 1102	Elements of Mathematics	Core	45	3
MTC 1103	Discrete Mathematics	Core	45	3
Physics				
PHY 1101	Mathematical Methods in Physics I	Core	45	3
PHY 1102	Properties of Matter	Core	45	3
PHY 1103	Heat and Thermodynamics	Core	45	3
Statistics				
STA 1101	Introduction to Statistics	Core	45	3

STA 1102	Statistical Organisation	Core	45	3
Common Courses				
ENG 1101	English Language and Grammar	Core	45	3
	Total CUs			55
	FIRST YEAR - SEMESTER 2			
Code	Course Name	Type	CH	CU
Chemistry				
CHE 1201	Basic Thermodynamics	Core	60	4
CHE 1202	Mathematics for Chemistry	Core	45	3
CHE 1203	Periodicity and Bonding	Core	45	3
Computer Science				
CSC 1201	Systems Analysis and Design	Core	60	4
CSC 1202	Object Oriented Programming	Core	60	4
CSC 1203	Database Management Systems	Core	60	4
Economics				
ECO 1201	Macroeconomics I	Core	60	4
ECO 1202	Principles of Development Economics	Core	60	4
Mathematics				
MTC 1201	Calculus II	Core	45	3
MTC 1202	Ordinary Differential Equations (ODE) I	Core	45	3
MTC 1203	Numerical Methods	Core	45	3
Physics				
PHY 1201	Classical Mechanics I	Core	45	3
PHY 1202	Electricity and Magnetism	Core	60	4
PHY 1203	Optics	Core	45	3
Statistics				
STA 1201	Time Series and Index Numbers	Core	45	3
STA 1202	Elements of Probability	Core	45	3
Common Courses				
PIE 1201	Introduction to Ethics	Core	45	3
LIT 1202	Literature and Composition	Core	45	3
Total CUs				61
	SECOND YEAR- SEMESTER 1			
Course Code	Course Name	Type	CH	CU
Chemistry				
CHE 2101	Advanced Thermodynamics & Surface Chemistry	Core	60	4
CHE 2102	Organic Chemistry II	Core	60	4
CHE 2103	Analytical Chemistry I	Core	45	3
Computer Science				
CSC 2101	Data Structures and Algorithms	Core	60	4
CSC 2102	Operating Systems	Core	60	4

CSC 2103	Data Communications and Networks	Core	60	4
CSC 2104	Logic Programming	Core	45	3
Economics				
ECO 2101	Microeconomics II	Core	60	4
ECO 2102	Labour Economics	Core	60	4
ECO 2104	Marketing and Cooperatives	Core	60	4
Mathematics				
MTC 2101	Calculus III	Core	45	3
MTC 2102	Linear Algebra II	Core	45	3
MTC 2103	Real Analysis I	Core	45	3
MTH 2104	Probability Theory	Core	45	3
Physics				
PHY 2101	Mathematical Methods in Physics II	Core	45	3
PHY 2102	Solid State Physics I	Core	45	3
PHY 2103	Wave Optics	Core	60	4
PHY 2104	Elements of Astronomy and Astrophysics	Core	45	3
Statistics				
STA 2101	Introduction to Non-Parametric Statistics	Core	45	3
STA 2102	Statistical Quality Control	Core	45	3
STA 2103	Pattern Recognition & Prediction in Statistics	Core	45	3
Common Courses				
COS 2101	Communication Skills	Core	45	3
Total CUs		Core		81
	SECOND YEAR - SEMESTER 2	Core		
Course Code	Course Name	Type	CH	CU
Chemistry				
CHE 2201	Advanced Electrochemistry & Chemical Kinetics	Core	60	4
CHE 2202	Analytical Chemistry II	Core	60	4
CHE 2203	Aromatic Chemistry and Stereochemistry	Core	45	3
Computer Science				
CSC 2201	User Interface Design and Development	Core	60	4
CSC 2202	Database Programming	Core	60	4
CSC 2203	Mobile Computing and Networks	Core	60	4
CSC 2204	Compiler Design and Construction	Core	45	3
Economics				
ECO 2201	Macroeconomics II	Core	60	4
ECO 2202	Econometrics I	Core	60	4
ECO 2203	Economics of Agriculture	Core	60	4
Mathematics				
MTC 2201	Partial Differential Equations (PDE)	Core	45	3
MTC 2202	Linear Programming	Core	45	3

MTC 2203	General Topology	Core	45	3
MTC 2204	Numerical Analysis I	Core	45	3
Physics				
PHY 2201	Classical Mechanics II	Core	60	4
PHY 2202	Quantum Mechanics I	Core	45	3
PHY 2203	Electronics	Core	60	4
PHY 2204	Introduction to Geophysics	Core	45	3
Statistics				
STA 2201	Advanced Probability Theory	Core	45	3
STA 2202	Time Series and Regression Analysis	Core	45	3
STA 2203	Statistical Modelling & Analysis	Core	45	3
Common Courses				
COC 2201	Research Methodology	Core	45	3
PEF 2201	Ethics in Focus	Core	45	3
CLS 2201	Original and Critical Language skills	Core	45	3
TOTAL CUS		Core		74
	THIRD YEAR- SEMESTER 1			
Course Code	Course Name	Type	CH	CU
Chemistry		Core		
CHE 3101	Transitional Metals, Organometallics & Crystallography	Core	60	4
CHE 3102	Organic Spectroscopy	Core	45	3
CHE 3103	Environmental Chemistry	Core	45	3
Computer Science				
CSC 3101	Data ware Housing and Business Intelligence	Core	60	4
CSC 3102	Systems Administration and Maintenance	Core	60	4
CSC 3103	Emerging Trends in ICT	Core	45	3
CSC 3104	Forensic Science	Core	45	3
Economics				
ECO 3101	Advanced Microeconomic Analysis	Core	60	4
ECO 3102	Economic Development, Policy and Planning	Core	60	4
ECO 3103	International Economics	Core	60	4
Mathematics				
MTC 3101	Real Analysis II	Core	45	3
MTC 3102	Complex Variables	Core	45	3
MTC 3103	Stochastic Processes	Core	45	3
MTC 3104	Functional Analysis	Core	45	3
Physics		Core		
PHY 3101	Computer Programming in Physics	Core	30	3
PHY 3102	Electromagnetism	Core	60	4
PHY 3103	Statistical Mechanics	Core	45	3
Electives (<i>at least</i>)				

one)				
PHY 3104	Introduction to Space Physics	Core	45	3
PHY 3105	Electronics and Instrumentation	Core	45	3
Statistics		Core		
STA 3101	Statistical Inference and Data Analysis	Core	45	3
STA 3102	Experimental Design and Industrial Statistical Modelling	Core	45	3
		Core		
STA 3103	Statistical Computing	Core	45	3
Common Courses				
BEN 3101	Business English	Core	45	3
	THIRD YEAR- SEMESTER 2	Core		
Course Code	Course Name	Type	CH	CU
Chemistry		Core		
CHE 3201	Natural Products Chemistry	Core	60	4
CHE 3202	Research Project	Core	120	4
CHE 3203	Heterocyclic Chemistry and Applied Organic Chemistry	Core	45	3
Computer Science				
CSC 3201	Computer Graphics and Animation	Core	60	4
CSC 3202	Software Engineering	Core	60	4
CSC 3203	Entrepreneurship	Core	45	3
Economics		Core		
ECO 3201	Intermediate Macroeconomic Theory	Core	45	3
ECO 3202	Econometrics II	Core	45	3
ECO 3203	Money, Banking and Public Finance	Core	45	3
Mathematics				
MTC 3201	Numerical Analysis II	Core	45	3
MTC 3202	Abstract Algebra	Core	45	3
MTC 3203	Number Theory	Core	45	3
Elective (at least one)				
MTC 3204	Biomathematics and Modelling	Core	45	3
MTC 3206	Life Insurance Mathematics	Core	45	3
Physics		Core		
PHY 3201	Solid State Physics II	Core	45	3
PHY 3202	Quantum Mechanics II	Core	45	3
PHY 3203	Nuclear Physics	Core	45	3
Electives (at least one)				
PHY 3204	Material Science	Core	45	3
PHY 3205	Solar Energy	Core	45	3
Statistics				

STA 3201	Sampling Theory	Core	45	3
STA 3202	Demographic and Social Statistics	Core	45	3
STA 3203	National Income Accounts	Core	45	3
Common Courses				
COC 3201	Science, Economics & Ethics	Core	45	3
COC 3202	Dissertation /Research Project	Core	60	4
	Total Program Load			