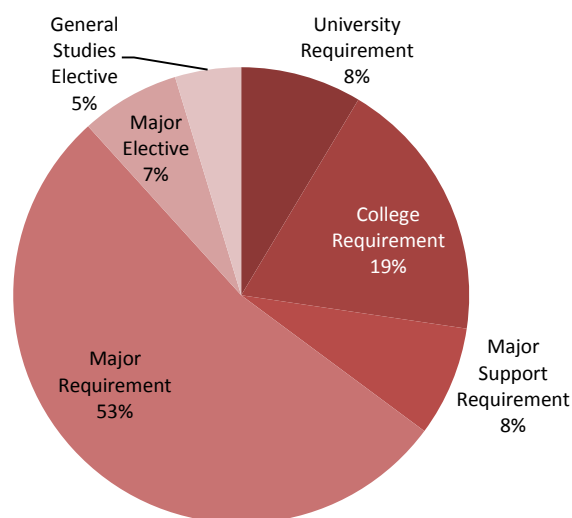


## B.Sc. in Actuarial Sciences 2018

### Program Components

Course Type	CRD
University Requirement (UR)	11
College Requirement (CR)	24
Major Support Requirement (MSR)	10
Major Requirement (MR)	68
Major Elective (ME) <sup>1</sup>	9
General Studies Elective (GSE) <sup>2</sup>	6
Training (Internship) Yes	1
<b>Total Credit (CRD)</b>	<b>128</b>



<sup>1</sup>Students should select two ME courses from list 1 plus one course from list 2.

<sup>2</sup> Student should select two General Studies Electives from list 3.

### Detailed Study Plan

#### Year 1 - Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
HRLC 107	Human Rights	2	0	2	UR	None	No
ENGL 125	English For Science I (SCI.)	3	0	3	CR	None	No
ITCS 113	Computer Programming I	3	2	3	CR	None	No
MATHS 121	Calculus and Analytic Geometry I	3	0	3	CR	None	No
PHYCS 101	General Physics I	3	3	4	CR	None	No

### Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
CHEMY 101	General Chemistry I	3	3	4	CR	None	No
ENGL 126	English For Science II (SCI.)	3	0	3	CR	ENGL 125	No
ITCS 114	Computer Programming II	3	2	3	MSR	ITCS 113	No
MATHS 122	Calculus and Analytic Geometry II	4	0	4	MR	MATHS 121	YES
STAT 271	Introduction to Probability	3	0	3	MR	MATHS 121	YES

### Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 102	General Biology I	3	3	4	CR	None	No
MATHS 204	Calculus and Analytic Geometry III	3	0	3	MR	MATHS 122	YES
ECON 140	Microeconomics	3	0	3	MR	None	YES
ACC 112	Financial Accounting I	3	0	3	MR	None	YES
STAT 371	Probability and Statistics I	3	0	3	MR	MATHS 122 and STAT 271	YES

### Year 2 - Semester 4

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
MATHS 211	Linear Algebra	3	0	3	MR	MATHS 121	YES
MATHS 205	Differential Equations	3	0	3	MR	MATHS 122	YES
ECON 141	Macroeconomics	3	0	3	MR	ECON 140	YES
ACC 113	Financial Accounting II	3	0	3	MR	ACC 112	YES
STAT 372	Probability and Statistics II	3	0	3	MR	STAT 371	YES

### Year 3 - Semester 5

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
PHYCS 102	General Physics II	3	3	4	MSR	PHYCS 101	No
STAT 374	Regression Analysis	3	0	3	MR	STAT 372 and MATHS 211	YES
FIN 220	Financial Management I	3	0	3	MR	ACC 113	YES
MATHS 371	Theory of Interest	3	0	3	MR	MATHS 122	YES
GSE xxx	Free Elective	3	0	3	GSE	None	No

### Year 3 - Semester 6

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITCS 214	Data Structures	3	2	3	MSR	ITCS 114	No
STAT 381	Time Series Analysis	3	0	3	MR	STAT 372	YES
FIN 320	Financial Management II	3	0	3	MR	FIN 220	YES
MATHS 372	Financial Economics for Actuaries	3	0	3	MR	MATHS 371	YES
Maths/Stat xxx	Maths/Stat Elective	3	0	3	ME	As per ME List 1	YES

#### Training Requirement

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
MATHS 399	Internship for Actuarial Science	0	0	1	MR-Training	Passes 75 credit hours	Yes

### Year 4 - Semester 7

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ISLM 101	Islamic Culture	3	0	3	UR	None	No
ARAB 110	Arabic Language Skills	3	0	3	UR	None	No
Maths/Stat xxx	Maths/Stat Elective	3	0	3	ME	As per ME List 1	YES
MATHS 471	Life Contingencies I	3	0	3	MR	MATHS 371	YES
FIN 425	Corporate Finance	3	0	3	MR	FIN 320	YES
MATHS 473	Loss Models I	3	0	3	MR	STAT 372	YES

### Year 4 - Semester 8

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
HIST 122	Modern History of Bahrain and Citizenship	3	0	3	UR	None	No
MATHS 472	Life Contingencies II	3	0	3	MR	MATHS 471	YES
MATHS 474	Loss Models II	3	0	3	MR	MATHS 473	YES
GSE xxx	Free Elective	3	0	3	GSE	None	No
BUS/IT xxx	Business/IT Elective	3	0	3	ME	As per ME List 2	No

## Major Elective Courses

### List 1 Mathematics and Statistics ME Electives

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
MATHS 253	Set Theory	3	0	3	ME	MATHS 121	Yes
MATHS 303	Analysis I	3	0	3	ME	MATHS 204	Yes
MATHS 311	Abstract Algebra I	3	0	3	ME	MATHS 211	Yes
MATHS 331	Numerical Analysis I	3	0	3	ME	MATHS 122 & ITCS 114	Yes
MATHS 461	Elementary Partial Differential Equation	3	0	3	ME	MATHS 204 & MATHS 205	Yes
STAT 391	Non Parametric Statistics	3	0	3	ME	STAT 271	Yes
STAT 394	Linear programming	3	0	3	ME	MATHS 122 & STAT 271	Yes
STAT 471	Decision Theory	3	0	3	ME	STAT 372	Yes
STAT 473	Introduction to Multivariate Analysis	3	0	3	ME	MATHS 211 & STAT 372	Yes
STAT 474	Statistical Modelling	3	0	3	ME	STAT 372	Yes

### List 2 Business and IT ME Electives

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
FIN 424	Investment Management	3	0	3	ME	FIN 320	No
FIN 426	International Financial Management	3	0	3	ME	FIN 320	No
FIN 434	Financial Risk Management	3	0	3		FIN 320	No
SBF 270	Islamic Banking and Finance	3	0	3		FIN 220	No
ITCS 316	Human-Computer Interaction	3	0	3		ITCS 214	No
ITIS 243	Web Design and Development I	3	0	3		ITCS 114	No
ITCS 285	Database Management Systems	3	0	3		ITCS 214	No

### List 3 Free Electives for MATHS

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		Lec	Prac	CRD		
FREN 141	French I	3	0	3	GSE	-----
FREN 142	French II	3	0	3	GSE	FREN 141
CHL 101	Introduction to Chinese Language	3	0	3	GSE	-----
CHL 102	Basic Chinese Language	3	0	3	GSE	CHL 101

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		Lec	Prac	CRD		
EDTC 100	Teaching and Learning TechNology	3	0	3	GSE	-----
EDPS 144	Psychology of Learning and Memory	3	0	3	GSE	-----
ART 133	Fundamentals of Music and Its Appreciation	3	0	3	GSE	-----
ART 141	Drawing and Painting	2	1	3	GSE	-----
ART 221	Traditional Music of Bahrain and Its Application	3	0	3	GSE	-----
EDAR 126	Playing on PiaNo and Org 1	3	0	3	GSE	-----
JAPN 101	Japanese Level I	3	0	3	GSE	-----
JAPN 102	Japanese Level II	3	0	3	GSE	JAPN 101
GERM 101	Introduction to German	3	0	3	GSE	-----
KL 101	Korean Language I	3	0	3	GSE	-----
KL 102	Korean Language II	3	0	3	GSE	KL 101
ENGL 130	Introduction to Literature	3	0	3	GSE	-----
PSYC 103	Introduction to Psychology	3	0	3	GSE	-----
PSYC 120	Psychology of Marriage	3	0	3	GSE	-----
PSYC 211	Educational Psychology	3	0	3	GSE	-----
PSYC 281	Thinking Skills	3	0	3	GSE	PSYC 103 or EDPS 241
SOCIO 161	Introduction to Sociology	3	0	3	GSE	-----
SOCIO 181	Introduction to Anthropology	3	0	3	GSE	-----
SOCIO 191	Citizenship, Identity and Globalization	3	0	3	GSE	-----
SOCIO 224	Sociology of Health	3	0	3	GSE	-----
SOCIO 226	Sociology of Arabian Gulf	3	0	3	GSE	-----
HISTO 212	Contemporary History of The Arab World	3	0	3	GSE	-----
HISTO 281	Landmarks of Islamic Civilisation	3	0	3	GSE	-----
ARAB 141	Modern Arabic Lit.	3	0	3	GSE	-----
ARAB 242	Arabic Poetry In The Renaissance Period	3	0	3	GSE	-----
ISLM 114	Quranic Sciences	3	0	3	GSE	-----
ISLM 136	Biography of The Prophet	3	0	3	GSE	-----
ISLM 141	Introduction to Shari'a	3	0	3	GSE	-----
ISLM 252	Islamic Doctrine	3	0	3	GSE	-----
LAW 101	Introduction to Legal Studies	3	0	3	GSE	-----
LAW 102	History of Law	3	0	3	GSE	-----
LAW 106	Constitutional Law I	3	0	3	GSE	-----

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		Lec	Prac	CRD		
MGT 341	Entrepreneurship and Small Business Management for Non Business Student	3	0	3	GSE	-----
TL 101	Turkish Language	3	0	3	GSE	-----
GSE XXX	Other electives	X	X	3	GSE	Department Approval

## Course Description

**Course Code:** ACC 112      **Course Title:** Financial Accounting I

A survey of the accounting cycle; recording changes in financial position; ledger; journal; trial balance; income measurement; adjusting and closing entries; accounting for merchandising operations; special journals and subsidiary ledgers; accounting for cash; receivables; inventories; plant and equipment.

**Course Code:** ACC 113      **Course Title:** Financial Accounting II

Accounting for partnerships and corporations: capital stock; dividends and retained earnings; long term liabilities and investment; statement of changes in financial position; cash flows, analysis and interpretation of financial statements, manufacturing accounts.

**Course Code:** ECON 140      **Course Title:** MicroecoNomics

Introduction to ecoNomic concepts, the ecoNomic way of thinking, decision-making, the study of scarcity, opportunity cost, how prices are determined and why they change, factors determining cost and the nature of costs, and how firms, under different market conditions, make price and output decisions in short run and long run.

**Course Code:** ECON 141      **Course Title:** MacroecoNomics

The study of the determination and systematic movement of broad aggregates such as total output, national ecoNomic growth, unemployment and inflation. How macroecoNomic policies such as fiscal and monetary policies affect the ecoNomic aggregates. The measurement of macroecoNomic variables, unemployment, determinants of real GDP and price level, fiscal policy, money, banking and monetary policy.

**Course Code:** FIN 220      **Course Title:** Financial Management

Functions of finance, legal and tax environments, role of financial markets, compound interest and present value, theory of financial valuation, basics of capital budgeting, financial analysis and planning, working capital management, short-term financing.

**Course Code:** FIN 320      **Course Title:** Financial Management II

Detailed analysis of capital budgeting under conditions of uncertainty: cost of capital, capital structure, dividend policy, long-term financing, capital markets, investment banking, common stocks, preferred stocks, debt instruments, leasing, convertibles, mergers and acquisitions, introduction to international finance, small company finance, and failure and reorganization.

**Course Code:** FIN 425      **Course Title:** Corporate Finance

Case applications of basic financial concepts, recent empirical and theoretical findings in the field of corporate finance. Financial analysis and planning, capital expenditure analysis, capital structure and dividend policies, corporate structure and restructuring, mergers and acquisitions, financial restructuring, and international corporate equity offerings.

**Course Code:** ITCS 114      **Course Title:** Computer Programming II

This course covers key concepts of object-oriented programming. Topics include object oriented design, encapsulation, event handlers, memory management, arrays, exception handlers, searching algorithms, programming applications.

**Course Code:** MATHS 122      **Course Title:** Calculus and Analytic Geometry II

Methods of integration. Applications to areas; arc length; volumes; etc. Parametric equations. Polar coordinates. Infinite series. Taylors' theorem and power series.

**Course Code:** MATHS 204      **Course Title:** Calculus and Analytic Geometry III

Vectors. Vector functions and vector analysis. Partial differentiation. Tangent planes. Normal lines. Chain rule. Maxima-minima. Higher order derivatives. Line integrals and multiple integrals. Applications to volumes and surface areas. Green's and Stokes' theorems.



**Course Code:** MATHS 211      **Course Title:** Linear Algebra

Fields. Vector spaces. Linear dependence and independence. Bases. Dimensions. Subspaces. Quotient spaces. Linear transformations. Connection with matrices. Change of bases (PAQ and PAP). Eigen-values. Characteristic polynomial. Minimal polynomial. Canonical forms in simple cases. Real and complex inner-product spaces. Orthogonal bases. Orthogonal and complex unitary matrices and their eigen-values. Orthogonal and unitary reduction of real symmetric and complex Hermitian matrices.

**Course Code:** MATHS 205      **Course Title:** Differential Equations

Differential equations of first order and their solution. Separable and exact equations. Equations convertible to separable type. Higher order linear equations with constant coefficients (homogeneous and Non-homogeneous). Power series method for second order linear equations. Variation of parameters. Laplace transform technique. Applications of differential equations.

**Course Code:** MATHS 371      **Course Title:** Theory of Interest

Introduction to the mathematics of interest and the evaluation of interest related products including annuities with Non-contingent payments, loans, bonds, general cash flows, portfolios, and immunization. Sources of interest rates, stochastic interest rates, and financial instruments such as shorts, swaps, and options. General derivatives, forwards and futures, hedging and investment strategies.

**Course Code:** MATHS 372      **Course Title:** Financial Economics for Actuaries

Forward, futures, swaps, and other derivatives. Option pricing theory. Interest rate modeling and simulation. Brownian motion. Black-Scholes formula. Delta-Hedging. Exotic Options. Risk Management techniques.

**Course Code:** MATHS 471      **Course Title:** Life Contingencies I

This course introduces students to the mathematical theory of contingencies. Topics include survival distributions, individual risk models, life tables, topics from life insurance, life annuities and benefit premiums.

**Course Code:** MATHS 472      **Course Title:** Life Contingencies II

This course is a continuation of the study of life contingencies. Topics include benefit reserve, multiple life functions, multiple decrement models, random and deterministic survivorship group, valuation of pension plans, and applications.

**Course Code:** MATHS 473      **Course Title:** Loss Models I

This course introduces students to the construction and evaluation of actuarial models. Topics include measures of risk, characteristics of actuarial models, severity models, frequency models and aggregate loss models.

**Course Code:** MATHS 474      **Course Title:** Loss Models II

This course is a continuation of the study of actuarial models. Topics include estimation of data, parameter estimation, model selection, simulation and credibility.

**Course Code:** STAT 271      **Course Title:** Introduction to Probability

Descriptive Statistics. Sample spaces. Probability functions. Conditional probability. Independence. Combinatorics. Random variables and their distributions. Distribution functions. Geometric, binomial, Poisson and other discrete distributions. Uniform, Normal and other continuous distributions. Some limit theorems.

**Course Code:** STAT 371      **Course Title:** Probability and Statistics I

Random variables and probability distributions. Moment generating Functions. Joint Probability distributions. Normal, gamma, Chi square and other distributions. Central Limit Theorem.

**Course Code:** STAT 372      **Course Title:** Probability and Statistics II

Point and interval estimation. Sampling distributions. t-, Chi-square and F-distributions. Test of hypotheses. Likelihood ratio test. Neyman-Pearson lemma. Correlation and regression.

**Course Code:** STAT 374      **Course Title:** Regression Analysis

Simple linear regression. Multiple linear regression. Analysis of residuals. Multicollinearity. Biased estimation. Sensitivity analysis. Selection of Variables. Non-linear regression. Response surface and correlation analysis.

**Course Code:** STAT 381      **Course Title:** Time Series Analysis

Introduction to linear and stationary time series. Autocorrelation modeling. Autoregression modeling. Moving average. ARMA models. ARIMA models. Introduction to spectral analysis of a time series. Introduction to Non-linear time series.

**Course Code:** MATHS 399      **Course Title:** Internship for Actuarial Science

The Internship course is designed to provide an opportunity to gain work experience related to the student's specified field of science, in a supervised workplace environment for a period of 8 consecutive weeks. The student shall submit a report upon completion.

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## College Requirement Courses Descriptions

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**Course Code:** CHEMY 101      **Course Title:** General Chemistry I

Significant figures, chemical formulas and equations; mass relations, limiting reactants and theoretical yield; Physical behavior of gases; electronic structure, periodic table, covalent bonding; Lewis structures, Molecular structures, hybridization; molecular orbitals, solutions; colligative properties. Related practical work.

**Course Code:** BIOLS 102      **Course Title:** General Biology I

Properties of life; atoms, molecules and chemical bonds; biomolecules; cell structure and function; bioenergetics (intermediary metabolism); cell reproduction; Mendelian genetics; structure of DNA; RNA and protein synthesis; molecular genetics.

**Course Code:** PHYCS 101      **Course Title:** General Physics I

Units and measurements; brief review of vectors; Newton's laws of motion; projectile motion; work and energy; impulse and momentum; rotational dynamics; equilibrium of a rigid body; periodic motion.

**Course Code:** MATHS 121      **Course Title:** Calculus and Analytic Geometry I

Algebra. Functions and graphs. Trigonometry. Conic sections. Limits and continuity. Derivatives and integrals. Applications of derivatives which include mean value theorem, extrema of functions and optimization. Definite integrals and the Fundamental Theorem of Calculus. Derivatives and integrals of exponential, logarithmic and inverse Trigonometric functions.

**Course Code:** ITCS 113      **Course Title:** Computer Programming I

This course introduces problem solving and fundamental programming concepts and techniques implemented by a high-level programming language. Topics include primitive and compound data types, syntax, semantics, expressions, assignment, input, output, conditional and iterative control structures, functions.

**Course Code:** ENGL 125      **Course Title:** English for Science I (SCI)

This is the first of two integrated language courses designed specifically for science majors. Special attention is given to scientific vocabulary and the unique features of technical writing. The course includes an extensive reading programme via a self-access lab.

**Course Code:** ENGL 126      **Course Title:** English for Science II (SCI)

English for Science is the second of two integrated language courses designed specifically for Science majors. Special attention is given to scientific vocabulary and the unique features of technical writing.

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## University Requirements Courses Descriptions

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**Course Code:** ARAB 110                      **Course Title:** Arabic Language Skills

This course focuses on basic Arabic skills including form, function, and meaning. It also helps the student to appreciate and understand structures and approach them from a critical point of view, through various genres in literature.

**Course Code:** HIST 122                      **Course Title:** Modern History of Bahrain and Citizenship

Spatial identity of Bahrain: Brief history of Bahrain until the 18th century; the historical roots of the formation of the national identity of Bahrain since the 18th century; the modern state and evolution of constitutional life in Bahrain; the Arabic and Islamic dimensions of the identity of Bahrain; the core values of Bahrain's society and citizenship rights (legal, political, civil and economic); duties; responsibilities and community participation; economic change and development in Bahrain; Bahrain's Gulf, Arab and international relations.

**Course Code:** HRLC 107                      **Course Title:** Human Rights

This course deals with the principles of human rights in terms of the definition of human rights, scope, sources with a focus on the International Bill of Human Rights; The Charter of the United Nations; Universal Declaration of Human Rights; The International Covenant on Economic, Social and Culture rights; Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment; Mechanics and the Constitutional Protection of Rights and Public Freedoms in Kingdom of Bahrain.

**Course Code:** ISLM 101                      **Course Title:** Islamic Culture

An introduction to the general outline and principles of Islamic culture, its general characteristics, its relationships with other cultures, general principles of Islam in beliefs, worship, legislation and ethics.