

## Bachelor of Science (Economics & Mathematics) Program

BS (Economics and Mathematics) is a 4-year degree program with double majors in economics and mathematics. It is designed to give students a solid foundation in both economics and mathematics. The program provides a well-coordinated curriculum for students interested in pursuing masters or PhD in economics and mathematics. It prepares the students for entry level positions in private and public sector corporations, banks, insurance companies, investment companies, education and research organizations. The program consists of 150 credit hours. Major disciplines of economics and mathematics have 54 credit hours each.

The remaining 42 credits are for university core courses and courses from other disciplines like social sciences, management and accounting. The wide range of courses offered in this program give students ample opportunity to broaden their knowledge base. The economics research project in the fourth year enables students to apply the quantitative tools learnt in the program to real economics and financial problems in the public and private sectors.

Everybody is like a magnet. You attract to yourself reflections of that which you are. If you're friendly then everybody else seems to be friendly too.

~Dr. David Hawkins

### Curriculum Structure

Duration	4 years
Semesters	8
Courses	48
Research Project	1
Total Credit Hours	150

### Required Courses

Section	Knowledge Area	Courses
A	University Core Courses	4
B	Economics	16
C	Mathematics	19
D	Non-Specialization	9
Total Courses		48

### A. University Core Courses

Course Title	Course Code	Credit Hours	Pre-Requisite
English Grammar and Composition	SSC101	3	-
Pakistan History	SSC151	3	-
Speech Communication	HUM201	3	-
Socioeconomic Philosophy of Islam / Philosophy, Logic and Ethics	SSC301 / HUM357	3	-

### B. Economics

Course Title	Course Code	Credit Hours	Pre-Requisite
Principles of Microeconomics	ECO103	3	-
Principles of Macroeconomics	ECO104	3	-
Intermediate Microeconomics	ECO201	3	ECO103, MTS101
Intermediate Macroeconomics	ECO202	3	ECO104, MTS101
Development Economics	ECO301	3	ECO103, ECO104, MTS112
Microeconomics	ECO312	3	ECO201, MTS112, MTS201
Macroeconomics	ECO313	3	ECO202, MTS112, MTS201

## B. Economics (Contd....)

Course Title	Course Code	Credit Hours	Pre-Requisite
Introduction to Econometrics	ECO341	4	ECO103, ECO 104 & MTS202
Applied Econometrics	ECO342	4	ECO341
Major Issues in Pakistan's Economy	ECO403	3	ECO301
Research Methods in Economics	ECO411	3	ECO342
International Trade	ECO511	3	ECO201, ECO202
Economics Elective-I	ECOxxx	3	-
Economics Elective-II	ECOxxx	3	-
Economics Elective-III	ECOxxx	3	-
Economics Elective-IV	ECOxxx	3	-
Economics Research Project	ECO441	4	ECO342

## C. Mathematics

Course Title	Course Code	Credit Hours	Pre-Requisite
Calculus-I & Plane Geometry	MTS101	3	-
Mathematical Methods	MTS110	3	-
Linear Algebra	MTS203	3	-
Discrete Mathematics	MTS211	3	-
Calculus-II & Solid Geometry	MTS232	3	MTS101
Calculus-III	MTS204	3	MTS232
Real Analysis	MTS301	3	MTS232
Complex Analysis	MTS302	3	MTS301
Advanced Differential Equations	MTS303	3	MTS401
Stochastic Processes	MTS304	3	MTS202 & MTS301
Abstract Algebra-I	MTS305	3	MTS203
Numerical Analysis	MTS413	3	MTS232
Differential Equations	MTS401	3	MTS232
Functional Analysis-I	MTS411	3	MTS302
Functional Analysis-II	MTS412	3	MTS411
Abstract Algebra-II	MTS306	3	MTS305
Scientific Computing for Linear PDE's.	MTS414	3	MTS232, MTS303 & MTS306
Mathematics Elective-I	MTSxxx	3	-
Mathematics Elective-II	MTSxxx	3	-

## D. Non-Specialization

Course Title	Course Code	Credit Hours	Pre-Requisite
Introduction to Computer Applications	MIS103	3	-
Introduction to Statistics	MTS102	3	-
Statistical Inference	MTS202	3	-
Applied Probability	MTS112	3	-
Regression Analysis & Experiment Design	MTS210	3	-
Non-Specialization Elective-I	xxxxxx	3	-
Non-Specialization Elective-II	xxxxxx	3	-
Non-Specialization Elective-III	xxxxxx	3	-
Non-Specialization Elective-IV	xxxxxx	3	-

## Economics Electives *(4 to be selected from the following list)*

Course Title	Course Code	Credit Hours	Pre-Requisite
Public Finance	ECO451	3	ECO103, ECO104
Islamic Economic System	ECO452	3	ECO103, ECO104
Labor Economics	ECO654	3	ECO103, ECO104
Population Economics	ECO454	3	ECO103, ECO104
Comparative Economic System	ECO455	3	ECO103, ECO104
Economics and Strategy	ECO456	3	ECO103, ECO104
Natural Resource and Environmental Economics	ECO461	3	ECO103, ECO104
Rural Development	ECO462	3	ECO103, ECO104
Financial Economics	ECO562	3	ECO103, ECO104
Game Theory	ECO464	3	ECO103, ECO104, MTS101
International Political Economy	ECO465	3	ECO103, ECO104
Monetary Economics	ECO566	3	ECO103, ECO104
History of Economic Thought	ECO467	3	ECO103, ECO104
Agricultural Economics	ECO468	3	ECO103, ECO104
Regional Economics	ECO469	3	ECO103, ECO104
Health Economics	ECO471	3	ECO103, ECO104
Urban Economics	ECO472	3	ECO103, ECO104
Welfare Economics	ECO473	3	ECO103
Resource Economics	ECO474	3	ECO103, ECO104

## Mathematics Electives *(2 to be selected from the following list)*

Course Title	Course Code	Credit Hours	Pre-Requisite
Numerical Solutions of PDE*	MTS431	3	MTS306
Integral Equations	MTS432	3	MTS401
Advanced Numerical Analysis I	MTS433	3	MTS301, MTS306
Advanced Numerical Analysis II	MTS434	3	MTS433
Differential Geometry	MTS435	3	MTS401, MTS301
Fluid Dynamics I	MTS437	3	MTS303
Fluid Dynamics II	MTS438	3	MTS437
Financial Mathematics with a computational approach	MTS441	3	MTS232, MTS304, MTS306
Computational Finance	MTS442	3	MTS441
Modern Algebra I (Galois Theory & Applications)	MTS443	3	MTS413
Modern Algebra II (Commutative Rings & Fields)	MTS444	3	MTS443
Measure Theory I	MTS445	3	MTS301
Measure Theory II	MTS446	3	MTS445
Operations Research I	MTS447	3	MTS203, MTS232
Operations Research II	MTS448	3	MTS447
Topology I	MTS451	3	MTS301
Topology II (Differential Topology)	MTS452	3	MTS451

\*PDE = Partial Differential Equation

### non-Specialization Electives

Four courses are to be chosen from courses other than Mathematics and Economics. These non-specialization electives may be from different subject areas including Accounting, Finance, Marketing, Management and Social Science.



### Semester-wise sequence of courses

FRESHMAN	Semester - 1	Course Code	Credit Hours	Pre-Requisite
1	Calculus-I and Plane Geometry	MTS101	3	-
2	Principles of Microeconomics-I	ECO103	3	-
3	Introduction to Statistics	MTS102	3	-
4	English Grammar and Composition	SSC101	3	-
5	Pakistan History	SSC151	3	-
6	Introduction to Computer Applications	MIS103	3	-
	Semester - 2	Course Code	Credit Hours	Pre-Requisite
1	Mathematical Methods	MTS110	3	-
2	Principles of Macroeconomics	ECO104	3	-
3	Statistical Inference	MTS 202	3	MTS102
4	Calculus-II and Solid Geometry	MTS232	3	MTS101
5	Speech Communication	HUM201	3	-
6	Non-specialization area Elective-I	-	3	-
SOPHOMORE	Semester - 3	Course Code	Credit Hours	Pre-Requisite
1	Calculus-III	MTS204	3	MTS232
2	Discrete Mathematics	MTS211	3	-
3	Intermediate Microeconomics	ECO201	3	ECO103, MTS101
4	Socioeconomic Philosophy of Islam / Philosophy, Logic & Ethics	SSC301 / HUM357	3	-
5	Applied Probability	MTS112	3	-
6	Non-specialization area Elective-II	-	3	-
	Semester - 4	Course Code	Credit Hours	Pre-Requisite
1	Linear Algebra	MTS203	3	-
2	Introduction to Differential Equations	MTS241	3	MTS101, MTS232
3	Regression Analysis and Experiment Design	MTS210	3	-
4	Intermediate Macroeconomics	ECO202	3	ECO103, MTS101
5	Development Economics	ECO301	3	ECO103, ECO104
6	Non-specialization area Elective-III	-	-	-

### Semester-wise sequence of courses

JUNIOR	Semester - 5	Course Code	Credit Hours	Pre-Requisite
1	Real Analysis	MTS301	3	MTS232
2	Advanced Differential Equation	MTS303	3	MTS241
3	Abstract Algebra-I	MTS305	3	MTS203
4	Microeconomics	ECO312	3	ECO201, MTS112,MTS201
5	Introduction to Econometrics	ECO341	4	ECO103, ECO104 & MTS202
6	Non-specialization Elective-IV	-	-	-
	Semester - 6	Course Code	Credit Hours	Pre-Requisite
1	Complex Analysis	MTS302	3	MTS301
2	Stochastic Processes	MTS304	3	MTS202, MTS301
3	Numerical Analysis	MTS306	3	MTS232
4	Macroeconomics	ECO313	3	ECO201, MTS112,MTS201
5	Applied Econometrics	ECO342	3	ECO341
6	Abstract Algebra-II	MTS306	3	MTS305
7	Economics Elective-I		3	-
SENIOR	Semester - 7	Course Code	Credit Hours	Pre-Requisite
1	Functional Analysis-I	MTS411	3	MTS302
2	Abstract Algebra-II	MTS412	3	-
3	Mathematics Elective-I	MTS	3	-
4	Research Methods for Economics	ECO411	3	ECO342
5	Major Issues in Pakistan's Economy	ECO403	3	ECO301
6	Numerical Analysis	MTS413	3	MTS323
6	Economics Elective-II	-	3	-
	Semester - 8	Course Code	Credit Hours	Pre-Requisite
1	Scientific Computing for Linear PDEs	MTS414	3	MTS232, MTS303,MTS306
2	Functional Analysis-II	MTS412	3	MTS411
3	Mathematics Elective-II	MTS	3	-
4	International Trade	ECO512	3	ECO201, ECO202
5	Economics Elective-III	-	3	-
6	Economics Elective-IV	-	3	-