

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 | - |