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● ACADEMIC SESSION  
2021/2022



B. APP. SC (HONS.)  
**APPLIED STATISTICS  
MATHEMATICS  
& ECONOMICS**

SCHOOL OF MATHEMATICAL SCIENCES  
UNIVERSITI SAINS MALAYSIA

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**SCHOOL OF MATHEMATICAL SCIENCES**  
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**INTRODUCTION**

The Bachelor of Applied Science degree programme in this school was introduced in the 1987/88 Academic Session. The programme emphasizes the applications of mathematics and gives emphasis to computing in the study of mathematical sciences. This is to produce graduates who are capable of carrying out research and development work in industries as well as in public and private agencies.

The School offers two areas of specialization:

- (i) Applied Statistics
- (ii) Mathematics and Economics

The above specializations were created in an effort to produce trained graduates in areas of applied mathematical sciences to support the nation's manpower need. The courses have been structured to provide a specialized and solid applied mathematical sciences education. The skills acquired provides a solid foundation for further development of mathematical skills.

**VISION**

To be a recognised department of mathematics that can attract excellent students and produce quality mathematicians nationally and internationally.

**MISSION**

To lead and innovate in achieving excellence in Mathematical Sciences at the international level through advancing and disseminating knowledge and truth; instilling qualities that stress academic excellence and professionalism; developing holistic individuals; and providing a strong commitment towards the aspiration of society; the country's vision and universal aspirations.

## **BACHELOR OF APPLIED SCIENCE (APPLIED STATISTICS)**

### ***Programme Objectives***

Graduates of Bachelor of Applied Science (Applied Statistics) will:

- (i) Excel in Applied Statistics practices in various industries
- (ii) Establish themselves as leaders in their careers
- (iii) Earned an advanced degree or professional certification

### ***Programme Learning Outcomes***

At the end of the programme, the students will possess:

1. Knowledge
  - Apply knowledge of fundamental and applied mathematics in various activities particularly in applied statistics.
2. Practical skills
  - Create, select and apply appropriate techniques/skills, resources, and modern tools to various activities particularly in applied statistics
3. Cognitive Skills
  - Identify, formulate, analyze and solve problems using fundamental and applied mathematics particularly in applied statistics
4. Communication Skills
  - Communicate effectively both orally and in writing as an individual, or as a member/leader in a team in various activities
5. Interpersonal Skills
  - Demonstrate effectively social skills and also social responsibilities as an individual
6. Ethics and Professionalism
  - Apply appropriate values, attitudes and professionalism in various activities particularly in applied statistics
7. Personal Skills
  - Recognize the need for, and is capable to undertake life-long learning in the broadest context of knowledge and/or technological change
8. Entrepreneurial Skills
  - Apply knowledge and understanding of project management and entrepreneurial skills in various projects or activities
9. Leadership, Autonomy and Responsibility
  - Able to be a skilled and innovative leader
10. Digital Skills
  - Gain digital skills in solving applied statistics problems
11. Numeracy Skills
  - Obtain numeracy skills to various applied statistics problems

## **BACHELOR OF APPLIED SCIENCE (MATHEMATICS AND ECONOMICS)**

### ***Programme Objectives***

Graduates of Bachelor of Applied Science (Mathematics and Economics) will:

- (i) Excel in mathematical and economical practices in various sectors
- (ii) Establish themselves as leaders in their career or societies
- (iii) Enroll for an advanced degree or professional certificate/skills

### ***Programme Learning Outcomes***

At the end of the programme, the students will possess:

At the end of the programme, the students will possess:

1. Knowledge
  - Acquire and apply knowledge of mathematical concepts to economics and financial fields
2. Practical skills
  - Obtain practical skills to various mathematics and economics problems)
3. Cognitive Skills
  - Identify, formulate, analyze and solve problems through the integration of mathematical techniques and/or economics knowledge
4. Communication Skills
  - Communicate ideas and knowledge in mathematics and economics clearly and effectively both orally and in writing as a member/leader in a team
5. Interpersonal Skills
  - Gain social skills and show social responsibilities
6. Ethics and Professionalism
  - Apply appropriate values, attitudes and professionalism in various activities particularly in mathematics and economics
7. Personal Skills
  - Recognize the need for, and is capable to undertake independent study and pursue personal and professional development
8. Entrepreneurial Skills
  - Recognize business, investment and entrepreneurship opportunities
9. Leadership, Autonomy and Responsibility
  - Able to be a skilled and innovative leader
10. Digital Skills
  - Gain digital skills in solving mathematics and economics problems
11. Numeracy Skills
  - Obtain numeracy skills to various mathematics and economics problems

**STAFF AND ADMINISTRATION**

**DEAN**



**Professor Dr. Hailiza Kamarulhaili**

**DEPUTY DEANS**



**Assoc. Prof. Dr. Lee See Keong**  
*Acting Deputy Dean*  
*(Academic, Career & International)*



**Associate Professor Dr. Farah Aini Abdullah**  
*(Industry-Community Engagement)*

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*Science*  
*(Mathematics)*



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*Applied Science*  
*(Mathematical Modelling)*



**Dr. Norhashidah Awang**  
*Applied Science*  
*(Mathematics and Economics)*



**Dr. Fam Pei Shan**  
*Applied Science*  
*(Applied Statistics/ Operations Research)*



**Dr. Yazariah Mohd. Yatim**  
*Facility & Teaching Development*  
*Co-ordinator*

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*Principal Assistant Registrar*



**Mr. Ahmad Wafi Sahedan**  
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Md Yushalify Misro, Dr  
Mohd Hafiz Mohd, Dr  
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Hasliza Razali	Chief Clerk
Mohd Zaidul Khair Mansor	Administrative Assistant (Clerical/Operation)
Noraidah Zamaludin	Administrative Assistant (Clerical/Operation)
Nor ‘Izzati Zaidi	Administrative Assistant (Clerical/Operation)
Nor Rafidah Abd Majid	Administrative Assistant (Clerical/Operation)
Nur Insyirah Abd Manaf	Administrative Assistant (Clerical/Operation)
Syed Mohamed Hussain Syed Osman	Engineering Assistant Officer



## REQUIREMENT OF THE PROGRAMME

(a) Specialization in Applied Statistics

<b>Type of Courses</b>	<b>Classification</b>	<b>Units</b>
Core	T	76
Minor / Elective	M / E	32*
University	U	20
Total Number of Units		128

- \* A student who chooses to do a minor needs to accumulate 20 units from one of the Minor Programmes.
- \* Please refer to the book of Minor Programmes Guideline. All Minor Programmes offered by other schools can be taken by the Mathematics students subject to the requirements imposed by the school which offers the Minor Programmes such as Management, Computer, Communications, Psychology, English or other Sciences.
- \* Students taking electives to replace minor are required to take courses offered by the school which have not been taken as compulsory core and compulsory elective courses. Students can take other courses with permission from the Dean.

(b) Specialization in Mathematics and Economics

<b>Type of Courses</b>	<b>Classification</b>	<b>Units</b>
Core	T	76 (Mathematics : 52) (Economics : 24)
Elective	E	32
University	U	20
Total Number of Units		128

## **COMPULSORY CORE AND ELECTIVE COURSES**

### **APPLIED STATISTICS SPECIALIZATION**

#### *Compulsory Core (76 units)*

MAT100/4	:	Mathematical Foundations
MAT101/4	:	Calculus
MAT111/4	:	Linear Algebra
MAT161/4	:	Elementary Statistics
MSG162/4	:	Applied Statistical Methods
MAT181/4	:	Programming for Scientific Applications
MAT201/4	:	Advanced Calculus
MAT223/4	:	Differential Equations I
MAT263/4	:	Probability Theory
MAT264/4	:	Non-Parametric Statistics
MSG265/4	:	Design and Analysis of Experiments
MSG287/3	:	Statistical Laboratory
MAT363/4	:	Statistical Inference
MSG368/4	:	Sample Survey and Sampling Technique
MSG460/3	:	Survival Analysis
MSG466/4	:	Multivariate Analysis
MSG467/4	:	Time Series Analysis
MSG469/4	:	Regression Analysis
MSG491/6	:	Project

#### *Compulsory Elective*

Choose 3 from 5 listed courses

MAT251/4	:	Introduction to Operations Research
MSG355/4	:	Inventory Control
MSG362/4	:	Quality Control
MSG370/4	:	Mathematics of Finance
MSG453/4	:	Queuing System and Simulation

#### *Option*

MSL399/4	:	Industrial Training
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**Core And Compulsory Elective Courses Registration Guide for Applied Statistics Specialization**

<b>Year of Study</b>	<b>Semester 1</b>	<b>Units</b>	<b>Semester 2</b>	<b>Units</b>
1	MAT100 MAT161 MAT181	4 4 4	MAT101 MAT111 MSG162	4 4 4
2	MAT201 MAT223 MAT264	4 4 4	MAT263 MSG265 MSG287	4 4 3
3	MAT363 MSG368 *MSG370	4 4 4	MSG466 MSG469 *MAT251 *MSG362	4 4 4 4
4	MSG467 MSG460 *MSG453	4 3 4	MSG491 *MSG355	6 4

\* Elective Courses : Choose 3 from the 5 listed courses.

## MATHEMATICS AND ECONOMICS SPECIALIZATION

### *Compulsory Core Mathematics Courses (52 units)*

MAT100/4	:	Mathematical Foundations
MAT101/4	:	Calculus
MAT111/4	:	Linear Algebra
MAT161/4	:	Elementary Statistics
MSG162/4	:	Applied Statistical Methods
MAT201/4	:	Advanced Calculus
MAT223/4	:	Differential Equations I
MAT251/4	:	Introduction to Operations Research
MAT263/4	:	Probability Theory
MSG287/3	:	Statistical Laboratory
MAT363/4	:	Statistical Inference
MSG386/3	:	Operations Research Laboratory
MSG491/6	:	Project

### *Compulsory Core Economics Courses (24 units)*

SKW109/3	:	Introduction of Economic Issues
SEW101/3	:	Microeconomics
SEW103/3	:	Macroeconomics
SEW202/3	:	Intermediate Microeconomics
SEW204/3	:	Intermediate Macroeconomics
SEW303/3	:	History of Economics
SEP206/3	:	Malaysian Economy
SEP304/3	:	Basic Econometrics

### *Compulsory Elective Courses (32 units)*

Choose at least 2 from 4 of the following courses:

SEU224/3	:	Economics of Agricultural Marketing and Cooperatives
SEU227/3	:	Development Economics
SEU230/3	:	Labour Economics
SEU231/3	:	Islamic Economics

Choose at least 2 from 5 of the following courses:

SEU332/3	:	Behavioral Economics
SEU334/3	:	Money, Banking and Financial Markets
SEU335E/3	:	Public Sector Economics I
SEU336E/3	:	Environmental and Natural Resources Economics
SEU339E/3	:	Economic Planning and Project Analysis

Choose at least 2 from 5 of the following courses:

- SEU411E/3 : International Trade
- SEU413E/3 : Monetary Economics
- SEU416E/3 : Public Sector Economics II
- SEU421E/3 : International Finance
- SEU422E/3 : Applied Economics

Choose at least 2 from the following courses:

- MSG370/4 : Mathematics of Finance
- MSG455/4 : Game Theory
- MSG456/4 : Mathematical Programming
- MSG467/4 : Time Series Analysis

*Option*

- MSL399/4 : Industrial Training

## Core And Compulsory Elective Courses Registration Guide for Mathematics and Economics Specialization

Students are required to check the list of courses offered at the beginning of each academic session.

Year of Study	Semester 1	Units	Semester 2	Units
1	MAT100 SKW109 MAT161	4 3 4	MAT101 MAT111 MSG162 SEP206	4 4 4 3
2	MAT201 MAT223 SEW101 SEW103	4 4 3 3	MAT251 MAT263 MSG287 SEW202 SEW204	4 4 3 3 3
3	MSG386 MAT363 SEW303 SEU230 <sup>b</sup> SEU231 <sup>b</sup> SEU332 <sup>c</sup> SEU335E <sup>c</sup> SEU336E <sup>c</sup>	3 4 3 3 3 3 3 3	SEP304 SEU224 <sup>b</sup> SEU227 <sup>b</sup> SEU334 <sup>c</sup> SEU339E <sup>c</sup>	3 3 3 3 3
4	SEU411E <sup>d</sup> SEU413E <sup>d</sup> *MSG370 *MSG455 *MSG456 *MSG467 SEU416E <sup>d</sup>	3 3 4 4 4 4 3	MSG491 SEU421E <sup>d</sup> SEU422E <sup>d</sup>	6 3 3

Compulsory Elective Courses

- <sup>b</sup> Choose at least 2 from these courses.
- <sup>c</sup> Choose at least 2 from these courses.
- <sup>d</sup> Choose at least 2 from these courses
- \* Choose at least 2 from these courses

### COURSE PREREQUISITE AND SEMESTER OF OFFERING

The prerequisites and semester of offering of the core and compulsory elective courses are as follows:

No.	Code & Title of Courses	Prerequisite	Semester Offered
1.	MAT100/4 : Mathematical Foundations	-	1
2.	MAT101/4 : Calculus	-	2
3.	MAT111/4 : Linear Algebra	-	2
4.	MAT161/4 : Elementary Statistics	-	1
5.	MSG162/4 : Applied Statistical Methods	MAT161 (S)	2
6.	MAT181/4 : Programming for Scientific Applications	-	1
7.	MAT201/4 : Advanced Calculus	MAT101 (S)	1
8.	MAT223/4 : Differential Equations I	MAT101 (S) and MAT111 (S)	1
9.	MAT251/4 : Introduction to Operations Research	MAT111 (S) and MAT161 (S)	2
10.	MAT263/4 : Probability Theory	MAT161 (S) and MAT201 (S)	2
11.	MAT264/4 : Non-Parametric Statistics	MSG162 (S)	1
12.	MSG265/4 : Design and Analysis of Experiments	MSG162 (S)	2
13.	MSG287/3 : Statistical Laboratory	MSG162 (S)	2
14.	MSG355/4 : Inventory Control	MAT251 (S)	2
15.	MSG362/4 : Quality Control	MSG162 (S)	2
16.	MAT363/4 : Statistical Inference	MAT263 (S)	1
17.	MSG368/4 : Sample Survey and Sampling Technique	MSG162 (S)	1
18.	MSG370/4 : Mathematics of Finance	MAT201 (S)	1
19.	MSG386/3 : Operations Research Laboratory	MAT251 (S)	1
20.	MSL399/4 : Industrial Training	At least accumulated 90 units	1
21.	MSG453/4 : Queuing System and Simulation	MAT181 (S) and MAT263 (S)	1
22.	MSG455/4 : Game Theory	MAT251 (S)	1
23.	MSG456/4 : Mathematical Programming	MAT201 (S) and MAT251 (S)	1
24.	MSG460/3 : Survival Analysis	MAT363 (S)	1
25.	MSG466/4 : Multivariate Analysis	MSG162 (S) and MSG287 (S)	2
26.	MSG467/4 : Time Series Analysis	MSG287 (S)	1
27.	MSG469/4 : Regression Analysis	MSG162 (S) and MSG287 (S)	2
28.	MSG491/6 : Project	-	1, 2

Sequential prerequisite (S) means if course A is a sequential prerequisite (S) to course B, then course A must be taken and assessed before course B is taken.

The prerequisites of courses for the Economics component are as follows:

No.	Code & Title of Courses	Prerequisite
1.	SKW109/3 : Introduction to Economic Issues	-
2.	SEW101/3 : Microeconomics	SKW109 (S)
3.	SEW103/3 : Macroeconomics	SKW109 (S)
4.	SEW202/3 : Intermediate Microeconomics	SEW101 (S)
5.	SEW204/3 : Intermediate Macroeconomics	SEW103 (S)
6.	SEW303/3 : Economics History	
7.	SEP206/3 : Malaysian Economics	SKW109 (S)
8.	SEP304/3 : Basic Econometrics	SEW101 (S), SEW103 (S)
9.	SEU224/3 : Agricultural Marketing and Cooperative Economics	SKW109 (S)
10.	SEU227/3 : Development Economics	SKW109 (S)
11.	SEU230/3 : Labour Economics	SKW109 (S)
12.	SEU231/3 : Islamic Economics	SKW109 (S)
13.	SEU332/3 : Behavioral Economics	SEW101 (S)
14.	SEU334/3 : Money, Banking and Financial Market	
15.	SEU335E/3 : Public Sector Economics I	SEW202 (S)
16.	SEU336E/3 : Environment Economics and Natural Resource	SEW101 (S)
17.	SEU339E/3 : Economic Planning and Project Analysis	SEW101 (S), SEW103 (S)
18.	SEU411E/3 : International Trade	SEW101 (S)
19.	SEU413E/3 : Monetary Economics	SEW103 (S)
20.	SEU416E/3 : Public Sector Economics II	SEW202 (S), SEU335E (S)
21.	SEU421E/3 : International Finance	SEW103 (S)
22.	SEU422E/3 : Applied Economics	SEW202 (S), SEW204 (S)

Sequential prerequisite (S) means if course A is a sequential prerequisite (S) to course B, then course A must be taken and assessed before course B is taken.

### **OPTIONAL UNIVERSITY COURSES**

In order to fulfill this requirement, students of the School of Mathematical Sciences are allowed to take any course outside the Schools of Mathematical Sciences, Chemical Sciences, Biological Sciences and Physics. Students are encouraged to take English language [LHP code], foreign languages, thinking techniques, history and philosophy of science courses.



## **SCHOOL'S FACILITIES**

The School of Mathematical Sciences has 3 undergraduate computer laboratories, a postgraduate computer laboratory and a research and development laboratory. These laboratories use Microsoft Windows operating System and are equipped with mathematical software.

## **GENERAL INFORMATION**

### **Awards**

Besides awards from the University, there are 3 other specific awards for mathematics students:

1. Tan Sri Dato' Professor Sir Alexander Oppenheim Book Prize for the best first year student.
2. Dato' Abdul Razak Yusof Gold Medal Award to the best final year student in the field of Mathematical Sciences.
3. Telesol Sdn. Bhd. Gold Medal Award to the best final year student in the field of Applied Sciences (Mathematics).

The Dean Lists certificates are awarded every semester to each academically excellent student who has obtained a GPA of at least 3.5 and accumulated at least 14 units.

The Dean's Award will be conferred to a student who has excelled both academically and in co-curriculum activities. Only one award is available for each year of study from each programme. A student of a CGPA of 3.7 and above in an academic session is qualified to be considered for this award.

### **Mathematical Sciences Society**

This society organizes various activities in order to promote mathematics amongst USM and secondary school students. Students of School of Mathematical Sciences are encouraged to join this society.

### **Graduate Programme**

The School also offers the following graduate programme:

- Master of Science (Mathematics) by research
- Master of Science (Statistics) by research
- Master of Science (Mathematics) by mixed-mode
- Master of Science (Statistics) by mixed-mode
- Master of Science (Teaching of Mathematics) by course-work
- Doctor of Philosophy by research