



Xi'an Jiaotong-Liverpool University

西交利物浦大學

School of Science

MODULE HANDBOOK

<p>MTH102</p> <p>Engineering Mathematics II</p>

Yinna Ye

Semester 2

2021-2022

SECTION A: Basic Information

□ Brief Introduction to the Module

This module is designed and developed particularly for 2nd Year undergraduates at XJTLU. It is intended as an elementary introduction to the theory of probability and statistics for engineering students.

□ Key Module Information

Module name: Engineering Mathematics II

Module code: MTH102

Credit value: 2.5 credits

Semester in which the module is taught: Semester 2

Pre-requisites needed for the module: N/A

Programmes on which the module is shared: BEng Computer Science and Technology, BEng Digital Media Technology, BEng Electrical Engineering, BEng Electronic Science and Technology, BEng Mechatronics and Robotic Systems, BEng Telecommunications Engineering

□ Delivery Schedule

Lecture room: EE101

Lecture time:

Lectures (Week 1 – Week 13)		Classroom (Week 1: online, Week 2-13 onsite)
Group 1	Tue. 11 am - 1 pm	SD154
Group 2	Mon. 9 – 11 am	SB152
Group 3	Mon. 9 – 11 am	SB120
Group 4	Tue. 11 am - 1 pm	SD114
Group 5	Thu. 11 am – 1 pm	SB120

Tutorial times:

Tutorials (Week 2, 4, 6, 8, 10, 12)		Classroom
Group 1	Fri. 10 -11 am	SD154
Group 2	Fri. 2 – 3 pm	SB152
Group 3	Fri. 11 – 12 am	SB120
Group 4	Fri. 9 – 10 am	SD114
Group 5	Fri. 2 – 3 pm	SB120

❑ **Module Leader and Contact Details**

Name: Yinna Ye

Email address: Yinna.Ye@xjtlu.edu.cn

Room number and office hours: MB324, Math Building, TBA

Preferred means of contact: email

❑ **Additional Teaching Staff and Contact Details**

Co-lecturer: Xinyao Yang

Email: Xinyao.Yang@xjtlu.edu.cn

Room number and office hours: TBA

Co-lecturer: Zhiping Rao

Email: Zhiping.Rao@xjtlu.edu.cn

Room number and office hours: TBA

SECTION B: What you can expect from the module

❑ **Educational Aims of the Module**

The aim of this module is

- To introduce topics in Probability and Statistics and to describe and discuss the potential scope of their applications.
- To present the basic concepts and results in Random Processes.
- To train the students' ability to think logically and independently and to acquire the skills of problem solving.

□ **Learning Outcomes**

- A. know how to describe statistical data;
- B. use the Binomial, Geometric, Poisson, Exponential, Raleigh and Normal distributions;
- C. have a good understanding of the basic concepts related to Gaussian random variables,
- D. have a good understanding of the Law of large numbers and Central Limit Theorem;
- E. have a good understanding of the basic concepts related to Poisson Process, correlation function, stationarity, and ergodicity.

□ **Assessment Details**

The Assessment Method for midterm and final exams may change in response to the situation of the pandemic control, and details should be sought from module leaders.

Sequence	Method	Assessment Type(EXAM or CW) ²	Learning outcomes assessed (use codes under Learning Outcomes)	Duration	Week	% of Final Mark	Resit(Y/N/S)*
001	Final Exam	EXAM	ALL	2 hours		70	S
002	Midterm Exam	EXAM		1.5 hours		20	S
003	2 Assignments	CW				10	S

**Note: The resit exam will assess all of the learning outcomes of the module, and will be weighted as 100% of the final module mark. Other components of the assessment, regardless of whether or not the student passed or failed, will not be included in the calculation of the final module mark, following resit examinations.*

❑ **Methods of Learning and Teaching**

The teaching philosophy of the module follows very much the philosophy of Syntegrative Education. This has meant that the teaching delivery pattern, which follows more intensive block teaching, allows more meaningful contribution from industry partners. This philosophy is carried through also in terms of assessment, with reduction on the use of exams and increase in coursework, especially problem-based assessments that are project focused. The delivery pattern provides space in the semester for students to concentrate on completing the assessments.

This module will be delivered by a combination of formal lectures, seminars and tutorials.

❑ **Syllabus & Teaching Plan**

Week number	Lecture	Teaching Material	Tutorial
Week 1	Lecture 1 - Permutations & Combinations	Slides No. 1: Permutations & Combinations	
Week 2	Lecture 2 - Probability Theory	Slides No. 2: Probability theory	Tutorial No. 1: Calculus Review
Week 3	Lecture 3 - Conditional Probability	Slides No. 3: Conditional Probability	
Week 4	Lecture 4 - Bayes' Rule & Independence	Slides No. 4: Bayes' Rule & Independent Events	Tutorial No. 2: Permutations & Combinations
Week 5	Lecture 5 - Discrete r.v.'s	Slides No. 5: Discrete r.v.'s - r.v.s, Mean and Variance	
Week 6	Lecture 6 - Discrete distributions	Slides No. 6: Discrete distributions - Binomial, Geometric, Poisson	Tutorial No. 3: Conditional Probability & Independence
Week 7 Mid-term Exam Week			
Week 8	Lecture 7 - Continuous r.v.'s	Slides No. 7: Continuous r.v.'s - r.v.s, Mean and Variance, Uniform	Tutorial No. 4: Discrete r.v.'s
Week 9	Lecture 8 - Continuous distributions	Slides No. 8: Continuous r.v.'s - Exponential, Normal, Reyleigh	

Week 10	Lecture 9 - Jointly Distributed r.v.'s	Slides No. 9: Jointly Distributed r.v.'s - Discrete and Continuous Joint Distributed r.v.'s, Covariance, Correlation Coefficient	Tutorial No. 5: Continuous r.v.'s
Week 11	Lecture 10 - Limit Theorems	Slides No. 10: Limit Theorems – Law of Large Numbers, Central Limit Theorem, Data Analysis	
Week 12	Lecture 11 - Random Processes	Slides No. 11: Random Processes - Random Process, Poisson Process	Tutorial No. 6: Jointly distributed r.v.'s & Limit theorems
Week 13	Lecture 12 - Revision	Slides No. 12: Revision (if time permitted)	
Week 14			Tutorial No. 7: Revision (if time permitted)

These arrangements are subject to change based on new directives from educational authorities as a result of the changing pandemic situation.

□ Tutorial Schedule

Student Group	Time	Day	Venue	Lecturer/Instructor
Group 1	10 - 11 am	Fridays	SD154	TA
Group 2	2 - 3 pm	Fridays	SB152	TA
Group 3	11-12 am	Fridays	SB120	TA
Group 4	9 – 10 am	Fridays	SD114	TA
Group 5	2 – 3 pm	Fridays	SB120	TA

❑ Reading Materials

Optional textbook is a book in print that students can choose to purchase or not.

Reference textbook is a book in print that is considered additional or recommended reading by academic staff and is only purchased for Library's collection where it can be offered for loan.

Title	Author	ISBN/Publisher
ADVANCED ENGINEERING MATHEMATICS	E KREYSZIG	CAMBRIDGE UNI
PROBABILITY WITH ENGINEERING APPLICATIONS	BRUCE HAJEK	SPRINGER UNDE
A FIRST COURSE IN PROBABILITY	SHELDON M. ROSS	9787111561484 /MECHANICAL INDUSTRY PRESS; EDITION 1 EDITION (2017/3/20)

SECTION C: Additional Information

❑ Student Feedback

The University is keen to elicit student feedback to make improvements for each module in every session. It is the University policy that the preferred way of achieving this is by means of an Online Module Evaluation Questionnaire Survey. Students will be invited to complete the questionnaire survey for this module at the end of the semester.

You are strongly advised to read the policies mentioned below very carefully, which will help you better perform in your academic studies. All the policies and regulations related to your academic study can be found in 'Student Academic Services' section under the heading "Policies and Regulations" on [E-bridge](#).

❑ **Plagiarism, Cheating, and Fabrication of Data.**

Offences of this type can result in attendance at a University-level committee and penalties being imposed. You need to be familiar with the rules. Please see the “Academic Integrity Policy” available on e-Bridge in the ‘Student Academic Services’ section under the heading ‘Policies and Regulations’.

❑ **Rules of submission for assessed coursework**

The University has detailed rules and procedures governing the submission of assessed coursework. You need to be familiar with them. Details can be found in the “Code of Practice for Assessment” available on e-Bridge in the ‘Student Academic Services’ section under the heading ‘Policies and Regulations’.

❑ **Late Submission of Assessed Coursework**

The University attaches penalties to the late submission of assessed coursework. You need to be familiar with the University’s rules. Details can be found in the “Code of Practice for Assessment” available on e-Bridge in the ‘Student Academic Services’ section under the heading ‘Policies and Regulations’.

❑ **Mitigating Circumstances**

The University is able to take into account mitigating circumstances, such as illness or personal circumstances which may have adversely affected student performance on a module. It is the student’s responsibility to keep their Academic Advisor, Programme Director, or Head of Department informed of illness and other factors affecting their progress during the year and especially during the examination period. Students who believe that their performance on an examination or assessed coursework may have been impaired by illness, or other exceptional circumstances should follow the procedures set out in the “Mitigating Circumstances Policy”, which can be found on e-Bridge in the ‘Student Academic Services’ section under the heading ‘Policies and Regulations’.

❑ **Learning Mall Online**

Copies of lecture notes and other materials are available electronically through Learning Mall Online, the University’s virtual learning environment at: learningmallonline@xjtlu.edu.cn.