



LIS205 - CALCULUS II
3-Credit Module
SPRING SEMESTER

SYLLABUS

Duarte Trigueiros duarte.trigueiros@usj.edu.mo

Office hours: Tuesdays, Wednesdays and Thursdays, from 10:30 am till 12:30 am

Module Description: Calculus II is the second of a two-part series of mathematics courses designed for Business students, focusing on the fundamentals of Calculus and its application to business, economics and finance. It covers functions and their graphs, limits, techniques of differentiation and integration, statistical inference and modelling, forecasting and principles of econometrics. The course combines both lecturing and problem solving sessions and students are assessed through examination and projects.

Learning Objectives: the objective of this module is to give students a solid understanding of mathematical / statistical methods. Other objectives include the promotion of critical thinking together with the understanding of numerical problem solving approaches.

Learning materials and resources: Smedley & Wiseman (2001). *Introducing pure mathematics*. Oxford University Press. Hodgson (1991). *Guided investigations into space and numbers*. Milton. Materials will be made available to students through the USJ Hub.

Assessment and final grading: knowledge will be assessed using quizzes and closed-book in-class exercises. There will be an exercise or quiz after each major topic where questions are drawn from lectures, class discussion, exercises and assignments. Thus in-class exercises and assignments are the study guide for tests. Grading is as follows:

1. Attendance and participation 20%
2. Class exercises 20%
3. Two quizzes plus exam 60%

Attendance and punctuality: failure to take a quiz and/or class exercise without validated reasons will be awarded a zero. Late submission will not be graded.

Course schedule and syllabus: the course comprises 14 sessions, each with one 3-hour class. Notwithstanding the need to introduce unexpected changes, the course schedule is as follows:

| Session no. | Topic |
|-------------|-----------------------------|
| Session 1 | Revisions from Calculus I |
| Session 2 | Random processes, queuing |
| Session 3 | Random processes, Normality |
| Session 4 | The behavior of prices |

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| Session 5 | Revisions and quiz number 1 |
| Session 6 | Components of time series, forecasting |
| Session 7 | Frequency comparison, Chi-Square |
| Session 8 | Correlation and regression |
| Session 9 | Predictive modelling in business |
| Session 10 | Revisions and quiz number 2 |
| Session 11 | Probabilities, probabilistic information |
| Session 12 | Bayes rule, business applications |
| Session 13 | Decision trees, decision making |
| Session 14 | Revisions and exam |

At the end of this module a student should be able to achieve the following objectives:

1. Identify problems and demonstrate knowledge of differentiation, non-linear optimization, integration and respective business applications;
2. Identify problems and demonstrate knowledge of the major random processes and respective business applications;
3. Be able to compare frequencies and perform inferences using the Chi-Square approach;
4. Model statistical relationships using regressions and evaluate goodness of fit;
5. Forecast time-series and identify their components;
6. Be aware of econometric questions such as sampling and missing variable biases and limitations of statistical modelling and inference;
7. Reason with probabilities, apply the Bayes rule to decision making;
8. Apply decision trees to simple capital budgeting problems
9. Develop both personal and team-building skills as well as leadership qualities.

Evaluation and grades' description:

1. Excellent: 19-20 marks: awarded when a student has shown attainment of all course objectives and learning outcomes, with a high level of intellectual and effective initiative and makes outstanding contributions to pair/teamwork.
2. Very good: 17-18 marks: awarded when all the objectives and learning outcomes have been addressed. Makes a significant contribution to teamwork and ability to reflect on own learning and decision making to a high level.
3. Good: 14-16 marks: awarded when all objectives have been addressed satisfactorily, or where the evidence is strong in some and weaker in others. Student has made an effective contribution to pair/team work and development of some effective skills.
4. Satisfactory Pass: 12-13 marks: awarded when the objectives have been addressed adequately, or there is evidence of strong learning in some and weaker in others. Knows a reasonable amount of content, but does not transfer or apply it easily.
5. Weak Pass: 10-11 marks: awarded when the objectives have been addressed minimally. The student demonstrates evidence of some effort in the acquisition of terminology. The student shows sufficient familiarity with the subject matter to enable progress without repeating the course. Below Pass: 9 marks: student shows misunderstandings and lack of effort/involvement in the course. Student has not achieved at least 50 percent of the credit on every course component. Work not submitted.