COURSE OUTLINE

Department & Faculty : Department of Mathematical Sciences, Faculty of Science, UTM	**Page : 1 of 4**
Subject & Code: MATHEMATICAL METHODS II (SSCM 1033) **Total Lecture Hours**: 42 hours	**Semester:** Semester 2 **Academic Session:** 2017/2018

Lecturer	Tel No	Room No	Programme/Section	e-mail
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PM Dr Ali Hassan		C22	1 SSCC	
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Synopsis :

This course is a continuation of SSCM 1023. Four main topics are covered, namely sequences and series, partial derivatives and its applications, and multiple integrals. Students will learn how to recognize the appropriate test of convergence for sequence and series, find partial derivatives and evaluate double and triple integrals. The use of cylindrical and spherical coordinates is also highlighted. Applications include finding the area, volume, mass, centre of gravity and moments of inertia of a solid.

Objectives:

At the end of this course, students should be able to:

1. Determine convergence of sequences and series.
2. Execute partial differentiation and multiple integration.
3. Apply knowledge of series, partial derivatives and multiple integrals to solve related problems.

Main References:

1. Thomas, G. B., ***Thomas' Calculus***, (2010), Pearson Addison Wesley.
2. Maslan Osman & Yusof Yaacob, **Multivariable & Vector Calculus**, (2008), Penerbit UTM.
3. Abd Wahid Wahid Md Raji et al. ***Advanced Calculus for Science and Engineering Students,*** (2013), Penerbit UTM.
4. Yusof Yaacob, **Calculus I SSH 1713 (Sequences, Series and Power Series)** - Teaching Module.

References:

1. Bradley, G. L and Smith, K. J., ***Calculus,*** (1998), Prentice Hall International, Inc.
2. Larson, R., Hostetler, R. P., Edwards, B. H., ***Calculus with Analytic Geometry***, (2006), Houghton Mifflin Company.
3. Alan Jeffrey, ***Advanced Engineering Mathematics***, (2002), Academic Press.
4. Kreyzing, Erwin, ***Advanced Engineering Mathematics***, (1993), John Wiley.
5. Glyn James, ***Advanced Modern Engineering Mathematics***, (2004), Addison Wesley.

Assessment:

Tests	Content	Date
Test I (15%) 1 hour	Lectures: Weeks 1-4	21 Mac 2018
Test II (20%) 1 hour 30 mins	Lectures: Weeks 5-11	8 May 2018
Final Examination (50%)	Lectures: Weeks 1-15	Final Examination Week
Quiz and/or Assignment and Presentation (15%)		

Teaching Methodology: Lectures and group discussions

Prepared by: **Name: Che Lokman Jaafar** **Signature:** **Date:** 2 Feb 2018	**Certified by:** **Name:** **Signature:** **Date:**

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Weekly Schedule

Week	Lecture Topics	Notes
1 11-15Feb	**Sequences:** Definition and limits.Convergent and Divergent sequences. The Sandwich theorem.	
2 18-22Feb	**Series:** Definition, the telescoping and geometric series. Divergence Test. The integral test and *p*-series. Comparison and Limit Comparison Tests	
3 25 Feb- 1Mac	Root and Ratio tests, radius and interval of convergence. Alternating series. Absolute convergence.	
4 4– 8Mac	**Power Series:** Definition, power series for functions including interval of convergence. Maclaurin and Taylor series.	
5 11-15Mac	Applications of power series to estimate definite integral and finding limits.	
6 18-22Mac	**Partial Derivatives**: Definition and notations. Geometrical interpretation as slope of tangent line and rate of change.	**Test 1 21/3/18** **Birthday of His Majesty Sultan Johor 23/3/18**
7 25-29Mac	Partial derivatives of first order, second order and mixed partial derivatives. Chain rulesfor functions of two or three variables.	
1 -5Apr	**Mid Semester I Break**	
8 8 - 14Apr	**Applications of Partial Derivatives:** Increments, total differential, estimations and errors, extreme value theorem, relative extrema, absolute extrema, Lagrange Multipliers.	
9 15– 19 Apr	Double Integrals: **Double integrals in rectangular coordinates. Type I and Type II regions. Interchanging limits of integration.**	
10 22 - 26Apr	Double integral in polar coordinates system. Converting integral in Cartesian to polar.	
11 29 Apr - 3May	**Triple integrals:** Triple integrals in rectangular coordinates. Fubini's theorem.	**Labour day 1/5/18**
12 6 - 10May	Triple integrals in cylindrical coordinates. Converting Cartesian integral to cylindrical.	**Test 2 8/5/18** **Wesak Day 10/5/18**
13 13 - 17May	Triple integrals in spherical coordinates. Converting Cartesian integral to spherical.	
14 20– 24May	**Applications of Multiple Integrals:** Area, volume, mass, center of mass, center of gravity, moments and moments of inertia.	
15 27May - 2Jun	**Revision week**	
16 3– 23 Jun 18	**Final Examination**	

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