



PUSAT PENGAJIAN PENDIDIKAN JARAK JAUH

Academic Planner

JIM 417 PARTIAL DIFFERENTIAL EQUATIONS

Academic Session 2019/2020

VIDEO CONFERENCE (WEBEX) CLASS		
Session	Date	Time
1		
2		
3		
4		
5		
6		
7		
8		

Students need to fill in the date and time of video conference (WEBEX) sessions. Please refer to the video conference (WEBEX) timetable for the Academic Session 2019/2020 provided.

JIM 417/4 - PARTIAL DIFFERENTIAL EQUATIONS

COURSE INSTRUCTOR: Dr. Mohd. Asyraf Mansor

✉ E-mail: asyrafman@usm.my

🏠 Room Number: KB/23

☎ Tel: 04-6535906

"The only way to learn Mathematics is by doing Mathematics" -Paul Halmos-

COURSE SYNOPSIS

Introduction to partial differential equations, its degree and order. Classification of partial differential equations to canonical form, parabolic, hyperbolic and elliptic, heat equation, wave equation and Laplace's equation. Separation of variables, Legendre and Bessel equations. Homogeneous and non-homogeneous equations. Canonical forms of the first and second order.

Laplace transformation, Fourier series.

Initial-Boundary value problems.

Fourier transforms and Green's Function.

REQUIRED MATERIAL

1. "DIFFERENTIAL EQUATIONS FOR ENGINEERING STUDENTS", ABD WAHID MD. RAJI & MOHD NOR MOHAMAD, 2008, COMTECH MARKETING SDN. BHD.
2. E-LECTURE AND EXTRA MODULE.

ADDITIONAL REFERENCES

1. O'Neil, P. V., Beginning Partial Differential Equations, 3rd Edition, John Wiley & Sons, 2014.
2. Yehuda, P., and Jacob, R., An Introduction to Partial Differential Equations, Volume 10, Cambridge University Press, 2006.
3. Buchanan, J. R., and Shao, Z., A First Course in Partial Differential Equations, World Scientific Publishing, 2018.

TOPICS COVERED

Only Chapters 4, 5 and 6 of the required text and e-Lecture, and Chapter 7 of the e-Lecture (or extra note) will be covered in this course. The following table is a detailed outline of the topics to be covered and the time table provided can be used as a guide to assist you in your study.

Month	Chapter	Page No.
September – October	Chapter 4: Laplace Transform	
	4.0 Introduction	189
	4.1 Definition and Notation	190
	4.2 Properties of the Laplace Transform	203
	4.3 Laplace Transforms of Special Functions	220
	4.3.1 Unit Step Function	222
	4.3.2 Unit Impulse Function	238
	4.3.3 Periodic Function	245
	4.4 Inverse Laplace Transform	255
	4.5 Properties of Inverse Laplace Transform	259
	4.6 Inverse Transforms of Rational Functions	271
	4.7 Convolution Theorem of Laplace Transform	275
	4.8 Applications of Laplace Transform	283
4.8.1 Initial Value Problems	284	
4.8.2 Boundary Value Problems	304	
November - December	Chapter 5: Fourier Series	
	5.0 Introduction	317

	5.1 Derivation of Fourier Coefficients 5.1.1 Convergence of the Fourier Series 5.2 Fourier Series of Even and Odd Functions 5.2.1 Even and Odd Functions 5.2.2 Fourier Series of Even and Odd Functions 5.3 Half-range Fourier Series	317 331 347 347 353 364
January – February (Intensive Course)	Chapter 6: Partial Differential Equations 6.0 Introduction 6.1 Basic Concepts 6.1.1 Boundary Conditions 6.1.2 Initial Conditions 6.1.3 Separation of Variables 6.2 The Heat Equation 6.3 The Wave Equation 6.4 The Laplace’s Equation 6.4.1 Extensions	381 382 388 389 391 395 415 430 440
February - March	Chapter 7 Part A: Classification of Second-Order Equations 7.1 Second-order Equations in Two independent Variables. 7.2 Canonical Forms. 7.3 Equations with Constant Coefficients. 7.4 General Solution.	e-Lecture or Extra Notes
April	Chapter 7 Part B: The usefulness of Laplace transforms to solve partial differential equations.	e-Lecture or Extra Notes

Exercises are given at the end of each chapter and students are encouraged to try as many exercises as possible. The exercises and WEBEX agenda will be uploaded to USM e-Learning portal before the WEBEX sessions. As a PPPJJ student, you are entirely responsible for your own success. Kindly manage your time wisely with all the assigned work completed and keep on practice.

VIDEO CONFERENCE (WEBEX)

There are 8 video conference (WEBEX) sessions will be conducted by the instructor throughout the academic year. Please read the required chapters from the textbook. Students are encouraged to attempt solving the given questions before attending each session as you are expected to participate in the live WEBEX discussions.

BEFORE INTENSIVE COURSE

Video Conference (WEBEX) 1:
Chapter 4

Video Conference (WEBEX) 2:
Chapter 4 and Chapter 5

Video Conference (WEBEX) 3:
Chapter 5

Video Conference (WEBEX) 4:
Chapter 6

AFTER INTENSIVE COURSE

Video Conference (WEBEX) 5:
Chapter 6

Video Conference (WEBEX) 6:
Chapter 7

Video Conference (WEBEX) 7:
Chapter 7

Video Conference (WEBEX) 8:
Final Revision

NOTE: Students are encouraged to solve the questions/tasks given in the e-Learning portal before or after attending each session. Be prepared to participate in the WEBEX sessions.

ASSIGNMENTS

Assignments are for your own benefit in order to retain your mathematical skills. **Please take it seriously as assignments will carry 20% weightage of your grade.** There will be 2 assignments. (*Questions will be posted on e-Learning portal*).

NOTE:

1. Assignments must be **hand written**. Sometimes the assignment might be in the form of the e-assignment or video assignment.
2. Please be advised that the assignments must **reached PPPJJ's office or e-portal submission platform** no later than the due date. **Late assignment will not be entertained nor graded.** Therefore please submit your assignment on time.
3. Plagiarism and copycat is prohibited; **zero mark** will be given to both, i.e. the one who copy the answer and also the one who let other to copy his/her assignment.
4. Assignments that have been submitted may not be returned, so please make your own copy for your keepsake.

The full solutions will be posted sometime after the due date on the e-Learning portal. I expect that you do your assignments on your own or discuss them with your coursemates at some level. This is a positive learning ethic. What you most emphatically should NOT do is copy answer from your coursemates.

Academic dishonesty is unacceptable and will be penalized accordingly.

CONTINUOUS ASSESSMENT (PB)

As part of the continuous assessment of the course, a test will be given during the intensive course.

Materials that will be tested: Topics covered from Webex 1 until Webex 4.

INTENSIVE COURSE

PPPJJJ Intensive Course will be held from **28th January 2020 – 13th February 2020**. More information about the activities during the Intensive Course will be given later. Kindly check the e-Learning portal religiously for the latest announcement about intensive course.

FINAL EXAMINATION

Final exam will be held during the month of **8th June 2020 – 28th June 2020** (tentatively). Please refer to e-portal from time to time for the final examination schedule. ALL topics covered during Webex 1 until Webex 8 will be tested.

COURSE GRADE

There will be 2 assignments, 1 continuous assessment (PB) and and a comprehensive final exam. The final course grade will be based on the following distribution:

Final Examination			60%
Coursework	Assignment 1	10%	40%
	Assignment 2	10%	
	Continuous Assessment	20%	

CONSULTANCY AND QUESTIONS

You can send me an e-mail if you need my assistance on Partial Differential Equations. You are also advised to utilize the e-learning portal inbox to pose any inquiries.

Kindly scan the QR code below to see my availability and the consultation hours for JIM417.



OR

URL: bit.ly/drasyrafpj