University of Dundee

EG21006 Fluid Mechanics *MODULE GUIDE AND SYLLABUS*

MODULE INFORMATION

EG21006 Fluid Mechanics
Semester 1, 2019-2020 Academic Year

MODULE INSTRUCTOR

Masoud Hayatdavoodi, Ph.D.
Lecturer
School of Science and Engineering

Office: Fulton Building, J10
E-mail: mhayatdavoodi@dundee.ac.uk
Website:`https://sites.dundee.ac.uk/masoud/`

CLASS SCHEDULE

- **Lectures:**
  Weeks 1-4, 8-12, Monday, 10:00AM - 11:00AM at Fulton F20
  Weeks 1-4, 8-12, Thursday, 09:00AM - 10:00AM at Carnelley Large LT
- **Tutorials:** Weeks 3,4, 8, and 10, Thursday, 10:00AM - 11:00AM at Scrymgeour 4.01
- **Laboratory*:** Weeks 8-12, Friday, 02:00PM - 05:00PM at Fulton F13, Fluid Mech. Lab
  * Note that students will only attend ONE 45-minute session during this period. Dates and times for each student will be announced by a week before the first experiments.

OFFICE HOURS

Wednesday: 12:00PM-01:00PM
Thursday: 12:00PM-01:00PM
And by appointments.

GRADING

Online Assignments (four)*	20%
Laboratory Assignment (one) *	20%
Final Examination **	60%

* The minimum pass mark for the combined coursework is 30%.
** The minimum pass mark for the final examination is 30%.

GRADING SCALE

A $\geq 70\%$
B $\geq 60\%$
C $\geq 50\%$
D $\geq 40\%$
F $< 40\%$
For more information see:
`https://www.dundee.ac.uk/governance/policies/policy-taught-provision/`

DEGREE EXAM

Semester 1 Examination begins on Monday 09/12/2019 and ends on Friday 20/12/2019. Exact day and time of this module's examination will be set and announced by the University prior to the examination week.

RECOMMENDED TEXTBOOKS

- White, F. M. (2015). Fluid Mechanics, McGraw-Hill Education; 8 edition, 864 p., ISBN: 978-0073398273.
- Douglas, John F., Gasoriek, Janusz M., Swaffield. John A. and Jack, Lynne B. (2011). Fluid Mechanics, Prentice Hall; 6 edition, 1012 p., ISBN: 978-0273717720.
- Munson, Bruce R., Rothmayer, Alric P., Okiishi, Theodore H. and Huebsch, Wade W. (2012). Fundamentals of Fluid Mechanics, Wiley; 7 edition, 792 p., ISBN: 978-1118116135.
- Kundu, Pijush K., Cohen, Ira M., Dowling, David R. (2015). Fluid Mechanics, Academic Press; 6 edition, 928 p., ISBN: 978-0124059351.

ADDITIONAL RESOURCES

- `http://web.mit.edu/hml/ncfmf.html`
- `http://www.efluids.com`
- `http://ocw.mit.edu`
- `http://www.annualreviews.org/journal/fluid`

MODULE COMMUNICATIONS

Module-related material, along with class communications, are held on *My Dundee* portal. Headlines of some (and NOT all) module material, and some tables and figures will be made available online through *My Dundee* portal. All Assignments and the solution sets, previous years' examinations, and further helpful resources will be made available online through *My Dundee* portal. Students are expected to check and use the module webpage regularly. Assignment sheets will be made available at least 7 days before the submission date. All required material should be downloaded from My Dundee and stored locally; access to the module page will not be extended beyond the current academic year.

MODULE AIMS

To introduce the fundamental theoretical and practical aspects of fluid mechanics.

INTENDED LEARNING OUTCOMES

- To develop knowledge of and proficiency in the the basic laws of fluid mechanics, the properties of fluids, the terminology used and to recognize the factors that affect flow in pipes and channels.
- To develop an understanding of an appreciation of fluid pressure and velocity, viscosity, laminar and turbulent flow, shear forces and friction factors, conservation of mass and momentum, Bernoulli's equation, steady flow in pipes, energy losses in pipes, uniform channel flow.
- To be able to carry out simple hydraulic calculations for pipes and channels, carry out laboratory experiments to measure piezometric heads, volumetric flow rates and friction losses in pipes, and to analyze the results within the theoretical framework of the lecture module.

PREREQUISITES

None

ATTENDANCE POLICES

The module content will be discussed in class. It is assumed that students will attend all classes (lectures and tutorials), and take notes of the material written on the board and discussed in class. Those who miss any of the lectures must follow a combination of approaches to catch up with the class as soon as possible. These include, but not limited to, (i) use of the concise reading list (available on *My Dundee*), (ii) use of the module content and schedule (next page), (iii) discussion with the module instructor during office hours, and (iv) note-borrowing from fellow students.

Tentative Schedule

Monday		Thursday	
Sep 16th Module Introduction	**1**	19th Viscosity and Pressure	**2**
23rd Hydrostatics	**3**	26th Buoyancy and Stability	**4**
30th Buoyancy and Stability	**5**	Oct 3rd Conservation Laws; Tutorial 1	**6**
7th Fluid Kinematics & Dynamics	**7**	10th Governing Equations; Tutorial 2	**8**
14th	**9**	17th	**10**
21st	**11**	24th	**12**
28th	**13**	31st	**14**
Nov 4th Pipe Flow	**15**	7th Pipe Flow; Tutorial 3	**16**
11th Pipe Flow	**17**	14th Pipe Flow	**18**
18th Open-channel Flow	**19**	21st Open-channel Flow; Tutorial 4	**20**
25th Open-channel Flow	**21**	28th Dimensional Analysis	**22**
Dec 2nd Degree Exam Review	**23**	5th Reading Day and Review	**24**