University of Dundee

EG21006 Fluid Mechanics *MODULE GUIDE AND SYLLABUS*

Module Information	**EG21006 Fluid Mechanics** **Semester 1, 2018-2019 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 3-12, Monday, 10:00AM - 11:00AM at Fulton F20
  Weeks 3-12, Thursday, 09:00AM - 10:00AM at Carnelley Large LT
- **Tutorials:** Weeks 4, 6, 8 and 10, Thursday, 10:00AM - 11:00AM at Scrymgeour 4.01
- **Laboratory*:** Weeks 6-12, 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

Monday: 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 03/12/2018 and ends on Friday 14/12/2018. 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, Bernoullis 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 24th Module Introduction	**1**	27th Preliminaries; Fluid Properties	**2**
Oct 1st Pressure	**3**	4th Hydrostatics; Tutorial 1	**4**
8th Hydrostatics	**5**	11th Fluid Kinematics and Dynamics	**6**
15th Conservation Laws	**7**	18th Governing Equations; Tutorial 2	**8**
22nd Pipe Flow	**9**	25th Pipe Flow	**10**
29th Pipe Flow	**11**	Nov 1st Pipe Flow; Tutorial 3	**12**
5th Open-channel Flow	**13**	8th Open-channel Flow	**14**
12th Open-channel Flow	**15**	15th Open-channel Flow; Tutorial 4	**16**
19th Dimensional Analysis	**17**	22nd Dimensional Analysis	**18**
26th Final Exam Review	**19**	29th Reading Day and Review	**20**