Course Title	Fluid Mechanics			
Course Code	DE6301			
Level	6			
Credits	MIT credits	15	NQF	
Course Hours	Lecture directed learning: Lecture: Blended: Tutorial: Laboratory:	45 22 10 5 8	Self directed learning: Independent study	105
Total Learning Hours	150		Attendance Requirement	N/A
Delivery Mode Level 1, 2, 3 or 4	3		Mode of delivery Intramural, distance, blended	Blended
Pre/co requisites	DE4101 Engineering Fundamentals DE4302 Mechanics DE4102 Engineering Mathematics 1			
Purpose	To understand and apply the principles of fluid statics and dynamics to common engineering problems.			
MIT Graduate Capabilities	The MIT Graduate Capabilities (GC) are as follows. The stage to which each is achieved is indicated in brackets. Zero indicates that the GC is not targeted in this course. a) Motivation (3) b) Ethical Behaviour (2) c) Critical thinking (3) d) Problem solving (3) e) Reading Literacy (2) f) Information Literacy (2) g) Professional Conduct (3) h) Team Work (3) i) Aro hā (0) j) Adaptability (2) k) Entrepreneurship (2) l) Interpersonal (2)			

<table>
<tr><th>Learning Outcomes</th><th>Outline of Content</th><th>Learning and Teaching Methods</th><th>Assessment Valid/Reliable</th><th>Resources Required Text, Web links, Equipment, Computer Labs etc as applicable</th></tr>
<tr>
<td>LO1 Demonstrate an understanding of the basic principles of fluid mechanics.

LO2 Describe and assess hydrostatic fluid applications.

LO3 Describe and assess hydrodynamic fluid applications.

LO4 Demonstrate an understanding of the requirements for fluid machinery.

LO5 Produce fluid power systems (pneumatic and hydraulic) to meet operational Requirements.</td>
<td>Fluid properties, density, viscosity, flash point. Hydrostatic pressure, thrust on perpendicular and inclined plates, buoyancy, transmissibility.

Fluid flow, Reynolds number, classification of fluid flows, conservation of mass, Bernoulli equation, action of fluid jets on plates. Flow measurement, types of flow meters. Friction and shock losses in pipelines, use of Moody charts, calculation of total head loss.

Hydraulic circuits, components, pump types, construction, characteristics, selection

Pneumatic circuits, components, construction, characteristics, selection and applications.

Fan types, construction, characteristics, selection and applications.</td>
<td>Interactive learning will be the primary learning method, which will enable one-on-one contact, group work and greater group interaction and cohesion.

Laboratory work will be used to demonstrate the practical component of the course, and putting the theory into practice

Group work will enable students to engage in class activities encouraging optimal use of the individual’s preferred learning style while developing the students’ ability to work together as a team.

Site visits will be used to demonstrate to students the range of actual work in an industry environment that relates to fluid mechanics.

LMS will be used as an interactive workshop, information repository to enable students to access materials presented in the classroom, and a means of interface between the participants to re-enforce the</td>
<td>
<table>
<tr><th>Assessment Type</th><th>Weighting</th><th>Outcomes Assessed</th></tr>
<tr><td>Assignment</td><td>30%</td><td>1, 4</td></tr>
<tr><td>Laboratories</td><td>20%</td><td>2, 3, 5</td></tr>
<tr><td>Examination</td><td>50%</td><td>1, 2, 3, 5</td></tr>
</table>
Formative Assessment:
Small structured tasks provide opportunities for ongoing formative assessment of students’ progress where possible. Students will do this in groups e.g. crossword puzzles, short quizzes, research assignments; Students are given the opportunity to practise their skills in a structured and supervised environment. This facilitates the opportunity for Q & A and constructive feedback on an ongoing basis. Students develop their skills throughout the lab session in preparation for their summative assessments

Summative Assessment:
Four Lab practical sessions to assess students’ ability to measure flow rates, energy use, capacity, temperature, pressure in a simulated safe environment This is a set of activities.
[LO 2,3,5]
Weighting 20%

One test and one assignment to investigate the application of fluid mechanical components. In the assignment the students will be required to write a report to demonstrate that they can research the construction, purpose</td>
<td>Fluid laboratory equipment

Learning commons environment including Digital classroom for group research activities and presentation.

Internet access:

Digital classroom for LMS, video and other lecturer led activities.

Electronic resources
Fluid Material by freestudy: http://www.freestudy.co.uk/c106.htm

Eaton’s Hydraulics Product database: http://hydraulics.eaton.com/products/menu_main.htm

Material on fan and blower: http://www.flickr.com/photos/22122687@N02/sets/72157626339236664/show/

Fluid mechanic theory: http://www.efunda.com/formulae/fluids/overview.cfm</td>
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</table>

		learning in the laboratory and classroom. LMS will also be used to deliver on-line assignments for students to complete within a given timeframe at their discretion. Students will be asked to conduct an **in-depth study** into some area of fluid mechanics. Students will then be asked to present this to the class. **Tutorials** will enable knowledge to be consolidated and clarified.	and typical application of a specific component. [LO 1,4] Weighting 30% National Set Written Exam to test overall knowledge of the course using detailed explanations. [LO 1,2,3,5] 50% *The student must achieve a min of 40% course work, a min 40% in the exam and an aggregate of 50% to pass the course.*	