![North Central State College logo]

North Central State College
MASTER SYLLABUS
2019-2020

A.   Academic Division: Business, Industry and Technology

B.   Discipline: Mechanical Engineering Technology

C.   Course Number and Title: MECT 4010 Applied Fluid Mechanics

D.   Course Coordinator: Daniel Wagner
          Assistant Dean: Toni Johnson, PhD

     Instructor Information:
       • Name: Click here to enter text.
       • Office Location: Click here to enter text.
       • Office Hours: Click here to enter text.
       • Phone Number: Click here to enter text.
       • E-Mail Address   Click here to enter text.

E.   Credit Hours: 4
          Lecture: 3 hours
          Lab: 2 hours

F.   Prerequisites: MECT 1750, MATH 1151

G.   Syllabus Effective Date: Fall, 2019

H.   Textbook(s) Title:

     Applied Fluid Mechanics
       • Authors: Mott, Untener
       • Copyright Year: 2014
       • Edition: 7th Edition
       • ISBN: 9780132558921

I.   Workbook(s) and/or Lab Manual:

J.   Course Description: This course explores the fundamentals of fluid statics and dynamics including differential analysis, dimensional analysis and similitude, laminar and turbulent flow, viscosity and boundary layer concepts, and compressible flow. Students will apply these principles to practical, applied problems such as; flow of fluids in pipes and conduits, pump selection and application, the design and analysis of HVAC ducts as well as Drag and Lift.

K.   College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Information Literacy	
Quantitative Literacy	

L.   Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Demonstrate an ability to understand the principles of fluid friction as it applies to series, parallel, and branch flow systems.	Problem based quizzes and exams
2. Apply fluid mechanics to industry and commerce.	Problem based quizzes and exams
3. Design piping systems manually and with computer software.	Problem based quizzes and exams
4. Design air systems manually and with computer software.	Problem based quizzes and exams
5. work in teams to conduct laboratory experiments, analyze and interpret experimental data as well as produce written reports that are coherent and present the obtained results in a logical, convincing fashion.	Laboratory Reports

ABET Outcomes:
- *Outcome b.* Use of computer aided drafting and design software;
- *Outcome c.* Perform selection, set-up, and calibration of measurement tools/instrumentation;
- *Outcome f.* Material science and selection;
- *Outcome h.* Mechanical system design;
- *Outcome i.* Thermal sciences (such as thermodynamics, fluid mechanics, heat transfer, etc.);
- *Outcome l.* Technical communication typically used in preparation of engineering proposals, reports, and specification.

M.   Topical Timeline (Subject to Change):

- Energy equation
- Darcy's equation
- Minor Losses
- Series Pipeline Systems: class I, II, and II
- Parallel and branching pipeline systems
- Pump selection and applications
- Flow measurements
- Flow of air in ducts
- Drag and lift

Major Laboratory Topics:
- Venturi effect
- Measuring the friction loss in pipes
- Minor losses in fittings
- Using software to investigate series pipeline systems
- Parallel flow
- Pump: System Resistance Curve
- Flow measurements
- Centrifugal fan characteristic curves

Week	Date	Topic	Chapter/section	Homework
1		Pressure and Measurement, Compressibility, Viscosity	1, 2, 3	
2		Static Fluid Forces, Buoyancy	4, 5	
3		Bernoulli's Equation (Applications and Restrictions)	6	
4		Fluid System Energy Equations, Laminar and Turbulent Flow	7,8	
5		**Review and Exam I**	**1 through 8**	
6		Velocity Profiles (Laminar, Turbulent), Minor Losses in Fittings	9, 10	
7		Series Pipeline Systems	11	
8		Parallel Pipeline Systems	12	
9		Pump Types, Pump Performance, Pump Selection	13	
10		**Review and Exam II**	**9 and 13**	
11		Open-Channel Flow	14	
12		Flow Measurements	15	
13		Forces Due to Fluids in Motion	16	
14		Lift and Drag	17	
15		Gas Flow and Pressure in Pipes, Gas flow in Ducts	18,19	
16		**Review and Exam III**	**14 through 19**	

N. Course Assignments:

- Quizzes
- Exams
- Laboratory Reports

O. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00--59	F	0.00	Failure

P.   <u>Grading and Testing Guidelines</u>:

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Q.   <u>Examination Policy</u>:

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R.   <u>Class Attendance and Homework Make-Up Policy</u>:

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S.   <u>Classroom Expectations</u>:

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T.   <u>College Procedures/Policies</u>:

Important information regarding College Procedures and Policies can be found on the [syllabus supplement](https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf) located at https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf