

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	Middle Technical University
2. University Department/Centre	Machinery and equipment Technical / automotive branch
3. Course title/code	Fluid and Thermodynamics
4. Programme(s) to which it contributes	Laboratories
5. Modes of Attendance offered	Compulsory Weekly hours
6. Semester/Year	yearly
7. Number of hours tuition (total)	90 hours
8. Date of production/revision of this specification	23/11/2016
9. Aims of the Course	Department of Machinery technologies / Automotive branch aims to prepare technical staffs that are a link between Specialist and technician The department prepares and create graduate and provide theoretical and practical information The process is to be able to implement the business entrusted to him .

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### A- Knowledge and Understanding

A1- Studying theoretical processes and cycles of Thermodynamics Theoretical study of different types of Heat transfer.

A2- making all students understand the theory and practical of thermodynamics basics.

A3- the possibility of using computer software that will related at this field.

### B. Subject-specific skills

B1 - skills in the repair and maintenance of automobiles workshops (machinery unit laboratories and workshops)

B2 - An increase in job skills in the use new technologies and software that we can say it's very useful at this field.

B3 - An increase in acts of skills.

### Teaching and Learning Methods

1 -Lectures 2. systematic training 3-laboratories 4- Summer Training  
5-workshops

### Assessment methods

1- experimental tests examinations 2. Quarterly 3- final exam 4- oral tests  
5- daily tests

### C. Thinking Skills

C1- Increase the student's desire to competence through the development of the relationship with the department

C2- Developing the relationship between the student and the professor and the article by explaining the scientific article modern methods

C3- Development of the relationship between the student and technical staff through the use of educational models

### Teaching and Learning Methods

1–Lectures 2- laboratory 3-mechanical workshops 4- systematic training  
5-summer training

## Assessment methods

1-Written tests 2 -quarterly examinations 3-final examinations 4- Education  
5-daily oral tests

## D. General and Transferable Skills (other skills relevant to employability and personal development)

D1- skills in maintenance and repair of machinery production (per unit of laboratories and workshops)

D2- increase student skills in production (quality and the quality of the product)

D3- increase student skills to work in mechanical workshops

D4-skills in how to use computers and other software .

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2Th+1Prac.	Student teaching how to understand the lesson	Types of unit systems, density, specific volume, pressure, temperature (Celsius and absolute), Properties of fluids : difference between fluids and solid metals, difference between liquids and gases	Theoretical + practical	Test + practical
2	2Th+1Prac	Student teaching how to understand the lesson	Definition of density, relative density, specific weight, specific volume, ideal fluid, real fluid, examples.	Theoretical + practical	Test + practical
3	2Th+1Prac	Student teaching how to understand the lesson	Shear stress, dynamics of fluid flow, Newton's Law of viscosity, dynamic viscosity, kinematic viscosity , surface tension.- Capillarity, liquid vapour pressure,	Theoretical + practical	Test + practical
4-6	2Th+1Prac	Student teaching how to understand the lesson	Pressure, liquid pressure head, Pascal law of pressure, variation of liquid pressure head with respect to gravity, pressure at a datum for stationary liquid	Theoretical + practical	Test + practical
7	2Th+1Prac	Student teaching how to understand the lesson	Fluid motion, fluid flow, pressure of fluid flow, laminar flow, turbulent flow, velocity profile of flow, Reynold's number.	Theoretical + practical	Test + practical
8	2Th+1Prac	Student teaching how to understand the lesson	Flow rate, volumetric flow rate, mass flow rate, - Continuity equation, problems on continuity equation for incompressible fluids.	Theoretical + practical	Test + practical
9-11	2Th+1Prac	Student teaching how to understand the lesson	Bernoulli equation and application.	Theoretical + practical	

12-14	2Th+1Prac	Student teaching how to understand the lesson	<p><b>First law of thermodynamics, kinds of energy, (dynamic energy, potential mechanical energy, internal energy, heat, work), work of a system represented on pressure – volume diagram, energy of flow, enthalpy, energy – conservation equation of first law of thermodynamics.</b></p> <p><b>Classifications of systems, application of first law of thermodynamics on closed systems, energy equation for steady flow, some application on first law for steady state open systems, application on first law for steady state open systems, application on (nozzle, diffuser, through, condenser, boiler, turbine, compressor, heat exchanger, open plane), representation of work for open systems for steady flow on pressure volume diagram, examples.</b></p>	Theoretical + practical	Test + practical
15	2Th+1Prac	Student teaching how to understand the lesson	<p><b>5) Second law of thermodynamics : Reversible process, entropy, temperature-entropy diagram, coordinates place on T-S diagram, cycles, work of cycle, thermal efficiency of cycle, examples.</b></p> <p><b>State of second law for heat engine, and for heat pump.</b></p>	Theoretical + practical	Test + practical
16-19	2Th+1Prac	Student teaching how to understand the lesson	<p><b>Ideal Gas : Specific heat at constant volume, specific heat at constant pressure, equation of ideal gas state, gas constant, universal gas constant.</b></p> <p><b>Constant volume process, constant pressure process, constant temperature process, studying of process on P – V</b></p>	Theoretical + practical	Test + practical

			<b>diagram and T – S diagram, examples.</b>		
20-24	2Th+1Prac	<b>Student teaching how to understand the lesson</b>	<b>Adiabatic process, isentropic process, studying of process on P -V diagram and T-S diagram , examples.</b>	Theoretical + practical	Test + practical
25-28	2Th+1Prac	<b>Student teaching how to understand the lesson</b>	<b>Heat transfer by conduction : Steady state heat conduction, conduction through homogenous plane wall, conduction through composite wall, thermal resistance, heat conduction through homogenous cylindrical wall, heat conduction through multi layers cylindrical wall, examples. Heat transfer by convection : free &amp; forced-thermal resistance Heat transfer by radiation, definition of thermal radiation, emissivity of black body, Stefan – Boltzmann law for radiation, emissivity</b>	Theoretical + practical	Test + practical
29-30	2Th+1Prac	<b>Student teaching how to understand the lesson</b>	<b>Heat exchangers and their types, logarithmic mean temperature difference, calculations of heat exchangers, effectiveness of heat exchangers, examples.</b>	Theoretical + practical	Test + practical

<b>12. Infrastructure</b>	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Textbooks countable by the Technical Education
Special requirements (include for example workshops, periodicals, IT software, websites)	Adoption of teaching on external sources + methodology in the preparation of lectures

Community-based facilities (include for example, guest Lectures , internship , field studies)	Adoption of teaching magazines and Reference article studied and reported by students
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13. Admissions	
Pre-requisites	
Minimum number of students	60
Maximum number of students	80

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Department**