

TEMPLATE FOR COURSE SPECIFICATION (Fuel technology)

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 programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Chemical Engineering Department
3. Course title/code	Fuel technology/243
4. Programme(s) to which it contributes	CE.243
5. Modes of Attendance offered	Fall
6. Semester/Year	2 semester/year
7. Number of hours tuition (total)	3
8. Date of production/revision of this Specification	5/6/2016
9. Aims of the Course	
1. Being familiar with physical and chemical properties of the petroleum products	
2. Understanding production process of the petroleum products briefly.	
3. Provide practice of preparation, procedure and characterization in terms of physico-chemical properties of the petroleum products.	

10• Learning Outcomes, Teaching, Learning and Assessment Method
<p>A-Knowledge and Understanding</p> <p>A1. Develop a deep understanding of issues related to the reaction step(s) in a chemical process and important role it plays in the success of the process both economically and environmentally.</p> <p>A2. The knowledge of the usage of the source of renewable energy and how to save this energy.</p> <p>A3. The equipments which are used the three types of fuels.</p> <p>A4. Understand of basic of combustion process, the exhaust gases of complete and incomplete reactions.</p>
<p>B. Subject-specific skills</p> <p>B1. Estimate the theoretical air, excess air, the exhaust gases of combustion.</p> <p>B2. The characterization of exhaust gases of complete and incomplete combustion.</p> <p>B3. The differences between wet and dry exhaust gases.</p>
Teaching and Learning Methods
Lectures, Tutorials, Example Classes, Weekly homework problems
Assessment methods
Midterm exams, Final exam, Quizzes, Weekly homework, Team and homework problems, partial test (Oral questions :- multiple choice, alternative response)
<p>C. Thinking Skills</p> <p>C1. Solve combustion calculations of different fuels through logic.</p> <p>C2. Characterization and analyses the performance of combustion equipments (burners and furnaces) and evaluate the operation of these equipments.</p> <p>C3. Characterization, analyses and evaluate scientific and engineering information and identify knowledge gaps and opportunities to the combustion of the different fuels.</p>
Teaching and Learning Methods
Lectures, Tutorials, Example Classes, Weekly homework problems.
Assessment methods
Midterm exams, Final exam, Quizzes, Weekly homework, Team and homework problems, partial test (Oral questions :- multiple choice), Open questions that have a definite answer, or do not have a definite answer

D.General and Transferable personal development).

Skills (other skills relevant to employability and

D1. Work together in same-discipline teams to solve engineering problems.

D2. To review state-of-the-art concepts for process intensification and design approaches used for such burners and furnaces..

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1 st semester					
1	1	provide an understanding of the general principles of Petroleum Analysis:	Petroleum Analysis: Definitions, Historical perspective, Modern perspective,	Lectures,	Partial test (Oral questions), Open questions that have a definite answer.
2	1	Understanding of analysis and specification, Sampling, Measurement.	Petroleum Analysis: Analysis and specification, Sampling, Measurement.	Lectures,	Open questions that have a definite answer.
3	1	knowledge and a deep understanding of issues related to petroleum, petroleum product assay	Petroleum and Petroleum Product: Petroleum: Definition, Petroleum assay (carbon residue, asphaltene content) Density, distillation,	Lectures,	Open questions that have a definite answer, (Oral questions)
4	1	provide an understanding of types & its properties of petroleum.	Petroleum: Light hydrocarbon, salt content, Sulfur content, Viscosity and pour point.	Lectures,	Open questions that have a definite answer, (Oral questions)

5	1	Evaluate Classification of petroleum	Petroleum Product: Refinery gases	Lectures,	Open questions that have a definite answer , (Oral questions)
6	1	Apply course concepts in petroleum assay	Petroleum Product: Refinery gases	Lectures,	Open questions that have a definite answer , (Oral questions)
7	1	Understanding Pretreatment of petroleum	Naphtha: [Production and Properties,	Lectures,	Open questions that have a definite answer , (Oral questions)
8	1	understanding of Desalting of crude oil	Naphtha: [Production and Properties	Lectures,	Open questions that have a definite answer , (Oral questions)
9	1	understanding of refinery gases.	Gasoline: [Production and Properties ,	Lectures,	Open questions that have a definite answer , (Oral questions)

10	1	understanding of Liquefied petroleum Gas	Gasoline: Test method(Additives, Combustion Characteristic ,Flash point and Fire point, Oxygenates ,Volatility)]	Lectures,	Open questions that have a definite answer , (Oral questions)
11	1	understanding of natural Gas	Aviation Fuel: [Production and Properties	Lectures,	Open questions that have a definite answer , (Oral questions)
12	1	Understand the Measurement of calorific value of gases fuel &its type	Aviation Fuel : Test method(Acidity ,Additives, Calorific value ,Density , Flash point , Freezing point, Pour point ,thermal stability).	Lectures,	Open questions that have a definite answer , (Oral questions)
13	1	Understand the Gases fuel: cleaning and purification	Kerosene: [Production and Properties	Lectures,	Open questions that have a definite answer , (Oral questions)
14	1	Understand the Distillation of crude oil	Kerosene Test method (Acidity ,Calorific value , Freezing point , Flash point , Smoke point, Viscosity, Water and Sediment)] .	Lectures,	Open questions that have a definite answer , (Oral questions)

15	1	Understand the Properties of petroleum: product The assay of gasoline	Diesel fuel: [Production and Properties	Lectures, Reports	Open questions that have a definite answer , (Oral questions)
2nd semester					
16	1	Understand the properties of Naphtha and kerosene ,	Diesel fuel: Test method (Acidity , Ash , Carbon residue , Cetane number and Cetane index ,Cloud point, Diesel index , Pour point and Volatility)].	Lectures, Reports	Open questions that have a definite answer , (Oral questions)
17	1	Understand the properties of diesel fuel	Distillate Fuel Oil : [Production and Properties	Lectures,	Open questions that have a definite answer , (Oral questions)
18	1	Understand the properties of Lubricant oil,	Distillate Fuel Oil : Test method(Acidity ,Ash content, Cloud point , Flash point , Pour point, Volatility ,Viscosity)].	Lectures, Reports	Open questions that have a definite answer , (Oral questions)
19	1	Understand the properties of Residual oil fuel,	Residual Fuel Oil : [Production and Properties	Lectures, Reports	Open questions that have a definite answer , (Oral questions)

20	1	Understand the properties of Distillate oil fuel,	Residual Fuel Oil : Test method(Ash, Asphaltene content, Carbon residue, Element analysis, Flash point, Pour point)].	Lectures, Reports	Open questions that have a definite answer , (Oral questions)
21	1	Understand the properties of Distillate oil fuel,	Mineral Oil: [Production and Properties	Lectures, Reports	Open questions that have a definite answer , (Oral questions)
22	1	Understand the properties of coal	Mineral Oil: Test method(acidity, aniline Point, Asphaltene content , Carbonizabale substances ,Carbon residue , Interfacial tension ,iodine value , and smoke point)] .	Lectures, Report	Open questions that have a definite answer , (Oral questions)
23	1	Understand the propertieswax	Lubricating oil: (production and properties)	Lectures, Report	Open questions that have a definite answer , (Oral questions)
24	1	Understand the properties of grease	Lubricating oil: test method, ash, asphaltene content, Carbonizabale substances, Color, Flash point, Viscosity)].	Lectures, Report	Open questions that have a definite answer , (Oral questions)

25		Understand the combustion of solid and liquid , gas fuel.	Grease: [Production and Properties)	Lectures, tutorial	Open questions that have a definite answer , (Oral questions)
26	1	Understanding how to calculate Theo. air,excess air.	Grease: Test method (Acidity , Anticorrosion properties ,Dropping point , Oil separation , Penetration and Viscosity)	Lectures, tutorial	Open questions that have a definite answer , (Oral questions)
27	1	Understand the types of burners.	Wax: [Production and Properties)	Lectures,	Open questions that have a definite answer , (Oral questions)
28	1	Understanding and design the types liq. and gas.	Wax Test method(appearance ,barrier properties , color ,hardness ,odor and taste , slip properties , strength)]	Lectures	Open questions that have a definite answer , (Oral questions)
29	1	Understand the Types of Furnaces	Asphalt: [Production and Properties, Test method (acid number, breaking point, carbonresidue, flash point, penetration)].	Lectures,	Open questions that have a definite answer , (Oral questions)

30	1	Understand the uses of the Steam&the types of boilers.	Coke: [Production and Properties, Test method (ash,calorific value, dust control material, proximate analysis, sulfur, volatile matter and water)].	Lectures,	Open questions that have a definite answer , (Oral questions)
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12.Infrastructure	
Requiredreading: ·CORETEXTS ·COURSEMATERIALS ·OTHER	<ol style="list-style-type: none"> 1. Speight,J.G,Handbook of petroleum product analysis, John Willey&Sons,2002. 2. Speight,J.G, and Ozum,B; Petroleum Refinery Processes, Macel Dekker, New York,2002. 3. Speight,J.G, The chemistry and Technology of Petroleum.3rd Edition .Marcel Dekker ,New York,1999. 4.Institute of Petroleum.2001.IP Standard Methods. The Institute of Petroleum,London, UK.5.
Specialrequirements(include for example workshops,periodicals, ITsoftware, websites)	Labrotaries
Community-based facilities (include forexample,guest Lectures, internship,field studies)	field trips

13. Admissions	
Pre-requisites	Before undertaking these lectures, the student should have undertaken the following:chemistryof petroleum
Minimumnumber ofstudents	Non
Maximumnumber ofstudents	Non