

Overview of the Second Level

The second level focuses on advanced specialized engineering courses for petroleum refining processes, fluid mechanics, heat transfer, and chemical analysis to prepare students for direct work in refineries and production units.

Course and Credit Hour Chart (Second Level) Academic Year 2024-2025

Course Code	Course Title	Theory	Practical	Units	Course Type
CPI201	Fluid Mechanics	2	3	3.5	Core Major
CPI202	Heat Transfer	2	3	3.5	Core Major
CPI203	Petroleum Technology and Refining	2	3	3.5	Core Major
CPI204	Physical Chemistry	2	2	3.0	Supporting Major
CPI205	Analytical Chemistry and Environmental Pollution	2	2	3.0	Supporting Major
CPI206	Applied Mathematics and Computing II	3	0	3.0	Basic Requirement

Detailed Course Description - Part One

1. Fluid Mechanics (Fluid Mechanics) Course Objective: Studying fluid properties (liquids and gases), hydrostatics, continuity equation, Bernoulli's equation, fluid flow in pipes, calculating pressure drop, and types of petroleum pumps and compressors. Practical Experiments: Reynolds Number measurement, Venturi and orifice meters, and calculation of pipe friction losses.	CPI201 3.5 Units
2. Heat Transfer (Heat Transfer) Course Objective: Understanding the three modes of heat transfer (conduction, convection, and radiation), designing Heat Exchangers and evaporators used in oil refineries. Practical Experiments: Thermal conduction in solids, measuring the efficiency of various types of heat exchangers.	CPI202 3.5 Units

Continuation of Detailed Description of Second Level Courses

3. Petroleum Technology and Refining (Petroleum Refining Technology)

CPI203 | 3.5 Units

Course Objective: Studying crude oil properties, primary treatment processes, atmospheric and vacuum distillation, catalytic reforming and cracking processes, and preparing petroleum products (gasoline, kerosene, diesel).

Practical Petroleum Tests: ASTM standard distillation, Flash Point, Pour Point, and API gravity.

4. Physical Chemistry (Physical Chemistry)

CPI204 | 3.0 Units

Course Objective: Laws of thermodynamics, chemical equilibrium, Phase Equilibria, chemical reaction kinetics, and the effect of catalysts.

Applied Lab: Determination of reaction rate, equilibrium between partially miscible liquids, and absorption laws.

5. Analytical Chemistry and Environmental Pollution (Analytical Chemistry & Environment)

CPI205 | 3.0 Units

Course Objective: Gravimetric and volumetric analysis, spectroscopic and chromatographic methods in analyzing petroleum pollutants, water treatment, and industrial chemical waste.

6. Applied Mathematics and Computing II (Applied Math & Computing II)

CPI206 | 3.0 Units

Course Objective: Ordinary and partial differential equations, numerical analysis, and using programming languages and simulation software to solve chemical equations.

Specialized Laboratories in the Department (Mosul)

The department contains specialized laboratories equipped with the latest testing devices: Petroleum Testing Laboratory, Fluid Mechanics and Heat Transfer Laboratory, Analytical and Physical Chemistry Laboratory, and Computer and Simulation Laboratory.