

To: The Engineering Faculty
From: Charles D. Davidson School of Chemical Engineering
Re: New Concentration in Gas & Petroleum

The Charles D. Davidson School of Chemical Engineering has approved the following addition of the new Gas & Petroleum concentration to the Chemical Engineering Professional Master's Program. This action is now submitted to the Engineering Faculty with recommendation for approval.

Concentration Description

The mission of the Professional Master's Concentrations in Chemical Engineering is to provide advanced technical education combined with the development of professional management skills in the key areas of chemical engineering related to industry sectors of regional, national, and international importance. This concentration will benefit from the resources provided by the NSF Center for Innovative and Strategic Transformation of Alkane Resources (CISTAR).

Justification

The new concentration is likely to be attractive to a much wider range of potential students.

There are three target audiences for these new concentrations.

1. *Existing Purdue BS students* who, upon graduation, wish to take further study to improve their skills and increase their employability in key industry sectors.
2. *International and domestic students at other institutions* who, upon graduation, wish to take the Professional Masters concentration at Purdue to gain a professional degree from a top U.S. engineering school to improve their skills and increase employability in key industry sectors.
3. *Practicing professional engineers* with the target industry sectors wishing to improve their skills and improve their career development pathways.

Students from target audiences 1 and 2 are likely to be full-time students, while practicing professional engineering are likely to enroll in a part-time manner. The program can be completed in one calendar year of full-time study (including a summer session).



Dr. Sangtae Kim
Distinguished Professor and Head
Davidson School of Chemical Engineering

Professional Master's Concentration in Chemical Engineering – Gas and Petroleum Engineering

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The Professional Master's in Chemical Engineering will be a series of new concentrations under the existing coursework Master's degree. There will be a common structure for all such concentrations.

1. All concentrations require:
 - a. Two core ChE courses (6)
 - b. Three courses that are considered core for that concentration (9)
 - c. Three course related to professional management (9)
 - d. 6 credit hours of a directed research project course (6)
2. Students without a Bachelor's in Chemical Engineering or equivalent may be required to take additional courses

Of the total 30 credit hours required for the degree, a minimum of 15 credit hours must be with a CHE prefix.

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Currently, the MS (non-thesis) in Chemical Engineering emphasizes technical courses only and does not have specialized concentrations. The new concentrations are likely to be attractive to a much wider range of potential students. The new Professional Master's concentrations do not have a thesis and do not articulate to the PhD program.

For the **Professional Masters Concentration in Chemical Engineering – Gas and Petroleum Engineering** the following faculty and staff are currently involved:

Faculty Coordinator: Fabio Ribeiro (Professor of Chemical Engineering)

Participating faculty: Jeffrey Miller (Professor of Chemical Engineering), Jeff Sirola (Professor of Engineering Practice), Rajamani Gounder (Associate Professor of Chemical Engineering), Jeffrey Greeley (Professor of Chemical Engineering), Rakesh Agrawal (Professor of Chemical Engineering), Michael Harris (Professor of Chemical Engineering)

Chemical Engineering staff: Nate Schultheiss (Director of Unconventional Energy), Ms. Maeve Drummond (Assistant Director of Education, CISTAR)

We expect the number of students enrolled to be 5 in the first year, and rise to 10-15 within three years of first offering the concentration.

Professional Masters Concentration in Chemical Engineering – Gas and Petroleum Engineering

Learning Outcomes: The graduate will be able to:

1. Employ theoretical and experimental methods to solve engineering challenges in the petroleum and gas field.
2. Identify key enablers in the fields of catalysis, separations and process intensification
3. Promote safe and environmentally responsible ways to use U.S. hydrocarbon resources.
4. Manage and lead within the petroleum and gas industry.

Core ChE curriculum (all concentrations): At least 6 credit hours from the following list:

- CHE 61000
- CHE 54000 or CHE 62000
- CHE 697000 (Stat Methods) or CHE 63000
- CHE 54300 or CHE 66000

Core Concentration Courses: At least 9 credit hours course akin to those from the following list:

Particulate Systems	CHE 53600
Industrial Catalytic Processes for Hydrocarbons	CHE 59700
Introduction to Light Hydrocarbons	CHE 59700
Catalysis	CHE 66200
Methods in Catalysis	CHE 66600

Management Courses: At least 9 credits of management courses akin to those from the following list:

Financial Marketing	MGMT 61000
Marketing Management	MGMT 62000
Strategic Management	MGMT 65000
Operations Management	MGMT 66000