To: Professor Hassan Hamdan Al Alkim, President

From: Prof. Stephen Wilhite, Provost Stephen C. Wilhite
Re: Academic Council Actions AY 2022- 2023 / MTG 5
Date: June 5, 2023

The Fourth Academic Council Meeting was held 5th June 2023 through Microsoft Teams. The main purpose of this meeting was to discuss one policy, consider the Substantive Change: BS in Petroleum Engineering Withdrawal, and to approve the Curriculum Items submitted by University Curriculum Committee on 18th May 2023 (excluding the SAS curriculum changes which will be considered in the next meeting), and to discuss the Internship Pre-requisite.

The Chair and Eight other members attended the meeting. The Chair of the University Curriculum Committee was invited to present the curriculum items endorsed by the University Curriculum Committee.

The Provost applied the motion procedure in considering all of the agenda items.

At its meeting of 5th June 2023 the AURAK Academic Council took the following actions, which I hereby submit for your consideration:

AY 22-23. 5.1 Welcome

- The meeting started at 12:00 pm with welcome remarks made by the Provost.

AY 22-23.5.2 Minutes and Actions from Previous Meeting:

- The Academic Council members unanimously approved Fourth Academic Council meeting which were circulated on 2nd June 2023 without any changes.
- The Action Grid : no action recorded.

AY 22-23.5.3 Policies and Procedures:

- Concurrent Enrollment at Other Institutions

✓ Mr. Kevin and Student Success Committee are currently reviewing the student policies. This issue had been discussed at the committee and recommendation was made that the pre approval should made at the Dean level, specifically for the issue of study abroad.

✓ The Provost and Mr. Kevin will schedule a follow up meeting to decide whether this issue will addressed in the context of an existing policy, or whether we need a standalone policy.

AY 22-23. 5.4 Substantive Change: BS in Petroleum Engineering Withdrawal

✓ The Dean School of Engineering presented the Substantive Change for BS in Petroleum Engineering Withdrawal and the reasons behind closing of the BS in Petroleum Engineering program as follows:

- Recommendation of Ernst & Young on their conducted study of the university, because of the low number of enrollment students
- Loss of scholarships for Petroleum Engineering students from ADNOC that contributed to low enrollment

✓ The Dean School of Engineering explained that with the close of the BS in Petroleum Engineering program the BS in Chemical Engineering Program will continue with a major in Petroleum Engineering.

✓ The Dean School of Engineering highlighted the financial impact on staffing with the closing of the BS in Petroleum Engineering:

- One faculty member's contract has been discontinued, leaving only two full-time faculty members in the program.
- The new major will ultimately be taught by 1 full time faculty and 1 adjunct, assuming a replacement faculty member can be hired in Chemical Engineering who can also teach Petroleum courses.

✓ The Provost suggested the following:

- Modify the staffing section to be read as "Following the withdrawal of the Bachelor of Science and Petroleum Engineering, AURAK retains a petroleum engineering option for interested students to meet the needs of the regional industry while significantly reducing staffing resources needed for a stand-alone program.",
- Include the departure of the third faculty member in the program in the document.
- Revise the excel sheet showing faculty deployment
- Reconsider technical electives which can serve the Chemical Program and Petroleum major

✓ The Dean School of Engineering raised the problem that we have in staffing since we have 3 faculty members in Chemical Engineering, with one leaving and 2 with administrative release.

✓ The Dean School of Arts and Sciences focused on academic and financial impacts.

✓ Dean School of Engineering pointed out that we have 26 student enrolled in the petroleum engineering program and that retaining that number of students in the Chemical Engineering program would be important.

➢ Ms. Amanda made a motion that adding a petroleum major in the Chemical Program does not represent a substantive change from SACSCOC perspective, but that withdrawing the Petroleum Engineering Program does need to be presented to SACSCOC as a substantive change. The motion was approved.

➢ The Dean School of Engineering will submit a revised proposal for the next Academic Council Meeting.

AY 22-23. 5.4 Curriculum Items

✓ **School of Business:**

Graduate Programs:

- Change of Existing Course:
  - MBFN 500:
    - Course Title from MBA Foundation to Business Graduate Foundation
    - Catalog Description
    - Grading Scale (from S/U to AURAK Grading System)

➢ The Dean School of Business requested to defer this item for the next meeting because the School of Arts and Sciences is introducing a new foundation course.

➢ **The Academic Council members unanimously approved the curriculum actions listed below:**

Undergraduate Programs:

The following undergraduate curriculum changes were approved by Academic Council:

✓ **School of Engineering:**
- **Civil and Infrastructure Engineering**
  - **Course Equivalency**
    - **CIEN 250 & ENGR 210**

Course	Equivalent Course	Notes
CIEN 250 (Engineering in Global Environment) – 2 credits	ENGR 210 (Sustainability in Engineering) – 2 credits	✓ ENGR 210 will **replace** CIEN 250 in the CIEN program starting Fall 2023. Equivalency is needed for students who follow earlier versions of the CIEN program. ✓ Both courses are similar and cover topics in sustainability but ENGR 210 will be offered to multiple engineering programs

✓ Both courses are similar and cover topics in sustainability but ENGR 210 will be offered to multiple engineering programs

- **Chemical and Petroleum Engineering**
  - **Program Revision:**

a) Merge of the following courses and change the course title:
- Merging of CHEN 371 Mass Transfer and MENG 361 Heat Transfer, which will result in the reduction

of 3 credit hours from the program credit hours. The title for the modified course will be **Heat and Mass Transport (CHEN 371) with total credits of 3 CH.**

- Merging of MENG 211 Thermodynamic and CHEN 312 Chemical Engineering Thermodynamic, which will result in the reduction of 3 credit hours from the program credit hours. **The title of the modified course will be Chemical Engineering Thermodynamics (CHEN 312).**

- Change of Existing Courses:

b) Reduce the credit hours and change the name and code of the course as follow:

- **CHEN 321:**
  - ✓ Reduce the credit hours of CHEN 321 Chemical Engineering Laboratory I **from 2 to 1 credit**
  - ✓ Change the course title to **Heat and Mass Transport Lab**
  - ✓ **Change the course code to CHEN 372.**
- **CHEN 422**
  - ✓ Reduce the credit hours of CHEN 422 Chemical Engineering Laboratory II from **2 to 1** credit
  - ✓ Change the course title to **Unit Operation Lab**
  - ✓ Change the course code to **CHEN 471**
- **CHEN 472**
  - ✓ Course Learning Outcomes (CLOs)

- New Courses:

(Core Courses)

- ENGR 210 Sustainability in Engineering (2 CH)
- CHEN 484 Process Integration and Optimization (3 CH)
- CHEN 352 Chemical Reaction Lab (1 CH)
- CHEN 483 Advance Simulation Lab (1 CH)
- ENGR 450 Engineering Seminar (1 CH)

(Technical Elective Courses)

- CHEN 464 Industrial Catalysis (3 CH)
- CHEN 476 Fundamentals of Nanotechnology (3 CH)
- CHEN 486 Data Science in Chemical Engineering (3 CH)

- Remove technical elective courses:
  - MIEN 555 Solid and Hazardous Waste Management
  - MSRE 512 Energy Systems Modeling and Optimization
  - MSRE 523 Biofuels

✓ **The Provost asked the School of Engineering to confirm that the Chemical Curriculum changes will be a part of the submitted substantive change proposal.**

Mechanical Engineering Program

- Change of Existing Courses:
  - IENG 231 Engineering Materials to MENG 241 Engineering Materials
  - IENG 232 Engineering Materials Lab to MENG 242 Engineering Materials Lab.
  - IENG 311Manufacturing Processes to MENG 312 Manufacturing Processes
  - IENG 313 Manufacturing Processes Lab to MENG 313 Manufacturing Processes Lab
  - IENG 321: Engineering Economy to MENG 323 Engineering Economy
  - Change the credit hours for IENG 311 (Manufacturing Processes) from 2 to 3 credits.
    Rational: the academic council recommended retaining 134 credits for the program. As a result, the number of credits assigned to the Manufacturing process course was changed from 2 to 3 credits.

Please refer to the Summary of Curriculum Changes proposed by the School of Engineering in the excel sheet below:

Chemical Engineering Program-Summary of Curriculum Changes					
#	**Program/Course**	**Nature of Change**	**Old**	**New**	**Justification**
	Summary of Program Changes				
1	**Chemical Engineering**	Introducing ENGR 210 "Sustainability in Engineering" course	N/A	A new course (ENGR 210, 2 CH) is added as SoE required course	ENGR 210 will be added as school of engineering requirement course that offered to multiple engineering programs to equip students with knowledge of sustainability issues, and their environmental, social and economic implications to engineering solutions.
		Introducing ENGR 450 "Engineering Seminar" Course	N/A	A new course (ENGR 450, 1 CH) is added as SoE required course	Incorporation of ENGR 450 is propose to cover topics related to engineering ethics, professionalism and employment opportunities.
		Merge two courses	• CHEN 371 Mass Transfer (3:0:0), and • MENG 361 Heat Transfer (3:0:0)	CHEN 371 Heat and Mass Transport (3:0:0)	To maintain total program credit hours of 133 CH considering addition of the new

					courses ENGR 210 and ENGR 450.
		Merge two courses	• MENG 211 Thermodynamic (3:0:0), and • CHEN 312 Chemical Engineering Thermodynamic (3:0:0)	CHEN 312 Chemical Engineering Thermodynamic (3:0:0)	Merging the two courses (6 CH) into one course (3 CH) will result in providing 3 CH which could be utilize in adding new course (CHEN 484 Process Integration and Optimization) to cover modern chemical engineering topics
		Introduce new program core course	N/A	A new course CHEN 484 Process Integration and Optimization Course (3:0:0) is added as CHE program requirments course (Compulsory)	The course is propose to cover modern chemical engineering topics.
		Reduce course credit hours	CHEN 321 Chemical Engineering Laboratory I credit hours is 2 CH (0:6:0)	Reduce credit hours for the lab-based course CHEN 321 from 2 to 1 CH and replace the course with new courses CHEN 372 Heat and Mass Transport Lab (0:3:0).	Reduction of the credit hours for the lab-based courses is proposed to maintain similar credit hours for all the lab-based course at the school of engineering and to introduce new practical courses.
		Reduce course credit hours	CHEN 422 Chemical Engineering Laboratory II credit hours is 2 CH (0:6:0)	Reduce credit hours for the lab-based course CHEN 422 from 2 to 1 CH and replace the course with new course CHEN 471 Unit Operation Lab (0:3:0).	

		Introduce new lab-based courses	N/A	Introduce new lab-based course CHEN 352 Chemical Reaction Lab (0:3:0).	Increase the number of practical and applied courses to support CHE students to build the gap between the theoretical and practical part of the chemical engineering discipline.
		Introduce new lab-based courses	N/A	Introduce lab-based course CHEN 483 Advance Simulation Lab (0:3:0).	
		Remove of Technical Elective courses and replace them with new chemical engineering base Technical Elective	• MIEN 555 Solid and Hazardous Waste Management • MSRE 512 Energy Systems Modeling and Optimization • MSRE 523 Biofuels	• CHEN 464 Industrial Catalysis • CHEN 476 Fundamentals of Nanotechnology • CHEN 486 Data Science in Chemical Engineering	Following the instructions of the CAA to remove graduate courses from undergraduate program technical elective. Accordingly the three graduate courses will be replaced by three new technical elective courses.
		Modification of Course Learning Outcomes of CHEN 472 Separation Processes course (3:0:0)	**CLO 1:** Express how separations are made by phase creation, phase addition and by	**CLO 1:** Express how separations are made by phase creation, phase addition and by introducing selective	The change on the course learning outcomes is proposed to accommodate the

			introducing selective barriers [1] **CLO 2:** Develop and apply the concept of phase equilibrium to the respective separation systems [1, 2] **CLO 3:** Design single and multistage extraction systems and estimate outlet concentration using graphical and analytical methods [2, 7] **CLO 4:** Propose the design and dimensioning of different separation systems and evaluate the efficiency of the process equipment [1, 2] **CLO 5:** Investigate the effect of operating conditions (T&P) on the separating performance [1] **CLO 6:** Utilize the use of computer software for simulating chemical separation processes. [1, 7]	barriers. [1] **CLO 2:** Develop and apply the concept of phase equilibrium to the respective separation systems. [1, 2] **CLO 3:** Design single and multistage separation systems and estimate outlet concentration using graphical and analytical methods. [2, 7] **CLO 4:** Design and propose the dimensions of different separation systems and evaluate the efficiency of the process equipment. [1, 2] **CLO 5:** Utilize the use of computer software for chemical separation processes simulation. [1, 7]	modification of the course content and addition associated new lab-based course (CHEN 471 Unit Operation Lab) where CHEN 472 will be the Co-requisite of the new course.

		New Credit Hour Distribution	• Total core courses in CHE program credit hours (69 CH) including 63 CH compulsory and 6 CH technical electives • Total School of Engineering Requirements credit hours (32 CH) • Total General Education Requirements credit hours (32 CH)	• Total core courses in CHE program credit hours (66 CH) including 60 CH compulsory and 6 CH technical electives • Total School of Engineering Requirements credit hours (35 CH) • Total General Education Requirements credit hours (32 CH)	This will ensure improving the program plan through introducing modern and practical topics and maintain the same program overall credits hours of 133.
Summary of Course Changes					
2	**CHEN 312 Chemical Engineering Thermodynamics (3:0:0)**	Course Learning Outcomes (CLOs)	None	None	The course is designed through merging of two program courses CHEN 312 & MENG 211 to maintain the total program credit hours of 133 despites of addition of the new course ENGR 210.
		Credit Hours	None	None	
		Co- requisites	None	None	
		Pre - requisites	MENG 211	CHEM 315	

		Course Description	This course aims to introduce the principles of Chemical Engineering Thermodynamics and illustrate their application to design of chemical processes. The content comprises the fundamentals of thermodynamics, such as thermodynamic properties (energy, entropy, enthalpy, heat capacity, etc.), the first and second law of thermodynamics (energy and entropy balance), heat of reactions, etc., thermodynamics of ideal and non-ideal gases and liquids, vapor-liquid equilibrium and thermodynamics of chemical processes. In addition, to the use of simulation packages to solve different thermodynamic problems.	This course aims to introduce the principles of Chemical Engineering Thermodynamics and illustrate their application. The content comprises the fundamentals of thermodynamics, such as thermodynamic properties (energy, entropy, enthalpy, heat capacity, etc.), the first and second law of thermodynamics (energy and entropy balance), heat of reactions, thermodynamics of ideal and real gases and liquids, vapor-liquid equilibrium and thermodynamics of chemical reaction processes. In addition, to the use of software tools to solve different thermodynam	

3	**CHEN 371 Heat and Mass Transport (3:0:0)** **Existing: Mass Transfer**	Course Learning Outcomes (CLOs)	**CLO 1:** Identify mass transfer modes, i.e. molecular and convective mass transfer, Interphase mass transfer. [1] **CLO 2:** Apply fundamentals of mass transfer to identify, formulate, and solve engineering problems for (i) steady state and (ii) transient conditions involving molecular, convective, or interphase mass transfer. [1] **CLO 3:** Obtain appropriate data (i.e. diffusion coefficient, density, viscosity) to solve problems from tables, correlations or experiment. [1, 6] **CLO 4:** Identify and use analogies between momentum, mass, and heat transfer. **CLO 5:** Apply fundamentals of mass transfer to identify, formulate, and design mass transfer equipment. [1, 2] **CLO 6:** Use numerical	**CLO 1:** Identify heat and mass transfer modes and use analogies between momentum, mass, and heat transfer. [1] **CLO 2:** Apply fundamentals of heat and mass transfer to identify, formulate, and solve engineering problems for (i) steady state and (ii) transient conditions [1] **CLO 3:** Obtain appropriate data to solve problems from tables, correlations or experiment. [1, 6] **CLO 4:** Apply fundamentals of heat and mass transfer to design transfer equipment. [1, 2] **CLO 5:** Use numerical methods to solve heat and mass transfer problems. [7]	The course is designed through merging of two program courses CHEN 371 & MENG 361 to maintain the total program credit hours as 133 despites of addition of the new course ENGR 210.

			methods to solve mass transfer problems		
		Credit Hours	3	3	
		Co- requisites	None	CHEN 312	
		Pre - requisites	CIEN 251	CIEN 251	

		Course Description	This course covers molecular and convective steady- and unsteady- state mass transfer, interfacial mass transfer and continuous and stage-wise contact operations, with applications in absorption, stripping, and humidification. Further, the course introduces the link between the theoretical part and experimental design of mass transfer equipment through physical tour of the Chemical Engineering unit operation facility	This course introduces the physical origins and the governing laws for heat and mass transfer. The principal topics covered include identification of the driving forces for heat and mass diffusion, development of transport models from first principles, steady state and transient solutions, fundamentals and engineering treatment of convection heat and mass transfer, heat transfer with phase change, radiation heat transfer in addition to interfacial mass transfer and continuous stage-wise contact operations. Further, the course introduces the link between the theoretical and experimental design of heat and mass transfer equipment.	

4	**CHEN 372 Heat and Mass Transport Lab (0:3:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Relate mathematical and engineering fundamental knowledge to experiment. [1, 6] **CLO 2:** Analyze and interpret experimental results for various variables and conditions. [1, 6] **CLO 3:** Develop knowledge and practice of personnel safety, process safety, and environmental protection. [4] **CLO 4:** Produce professional level memos, reports, and communicate effectively through oral presentation. [3] **CLO 5:** Operate collaboratively in team and respect team work ethics through group leading and task management. [5]	The chemical engineering program proposing introducing this course to equip students with practical and applied knowledge on the area of fluid, mass and heat transfer and support the CHE students to link between the theoretical and practical part of the chemical engineering discipline.
		Credit Hours	None	1	
		Co- requisites	None	CHEN 371	
		Pre - requisites	None	None	

		Course Description	None	This course is composed of a set of selected experiments which demonstrate and apply the concepts of fluid, heat and mass transfer. The course aims to develop student's basic knowledge in: volumetric properties of pure fluids, principles and concepts related to heat transfer, principles of steam and power systems, principles of fluid flow (laminar flow and turbulent flow) and principles of heat exchangers. The lab also includes an open-ended design of experiment.	

5	**CHEN 472 Separation Processes (3:0:0)**	Course Learning Outcomes (CLOs)	**CLO 1:** Express how separations are made by phase creation, phase addition and by introducing selective barriers [1] **CLO 2:** Develop and apply the concept of phase equilibrium to the respective separation systems [1, 2] **CLO 3:** Design single and multistage extraction systems and estimate outlet concentration using graphical and analytical methods [2, 7] **CLO 4:** Propose the design and dimensioning of different separation systems and evaluate the efficiency of the process equipment [1, 2] **CLO 5:** Investigate the effect of operating conditions (T&P) on the separating performance [1] **CLO 6:** Utilize the use of computer software for simulating chemical separation processes. [1, 7]	**CLO 1:** Express how separations are made by phase creation, phase addition and by introducing selective barriers. [1] **CLO 2:** Develop and apply the concept of phase equilibrium to the respective separation systems. [1, 2] **CLO 3:** Design single and multistage separation systems and estimate outlet concentration using graphical and analytical methods. [2, 7] **CLO 4:** Design and propose the dimensions of different separation systems and evaluate the efficiency of the process equipment. [1, 2] **CLO 5:** Utilize the use of computer software for chemical separation processes simulation. [1, 7]	The change on the course learning outcomes is proposed to accommodate the modification of the course content and addition associated new lab-based course (CHEN 471 Unit Operation Lab) where CHEN 472 will be the Co-requisite of the new course.
		Credit Hours	None	None	

		Co- requisites	None	None	
		Pre - requisites	CHEN 371	CHEN 371	
		Course Description	None	None	
6	**CHEN 471 Unit Operation Lab (0:3:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Relate mathematical and engineering fundamental knowledge to experimental and simulation. [1, 6] **CLO 2:** Analyze and interpret experimental results under different operation conditions. [1, 6] **CLO 3:** Develop knowledge and practice of personnel safety, process safety, and environmental protection. [4] **CLO 4:** Construct and present technical information effectively in written and oral form. [3] **CLO 5:** Operate collaboratively in team and respect team work ethics through group leading and task management. [5]	The chemical engineering program is proposing introducing this course to equip students with practical and applied knowledge on the area of mass transfer, separation processes and chemical engineering process control. In addition the course is designed to support the CHE student to overcome the gap between the theoretical and practical part of the chemical engineering discipline.
		Credit Hours	None	1	
		Co- requisites	None	CHEN 472	
		Pre - requisites	None	None	

		Course Description	None	This course aims to deepen the students' knowledge of the unit operations with a focus on distillation, absorption, liquid-liquid extraction, membrane and drying processes. This course requires students to integrate and apply knowledge from previous chemical engineering courses to design experiments, collect data, analyze results and make recommendations. Students will also work on developing oral and written technical communication skills.	
7	**CHEN 483 Advanced Simulation Lab (0:3:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Design and simulate a single process unit using process simulators. [1, 2] **CLO 2:** Use process simulator to estimate process economics [1, 7] **CLO 3:** Generate and evaluate thermodynamics and property methods [1, 6] **CLO 4:** Propose mass and heat integration strategy and complete process design using simulation tools. [2, 7]	The chemical engineering program is proposing introducing this course to equip students with practical and applied knowledge on the area of chemical processes modeling and simulation and support students to improve their process simulation skills.
		Credit Hours	None	1	

		Co- requisites	None	CHEN 472	
		Pre - requisites	None	CHEN 312	
		Course Description	None	This course focus on the use of process simulators such as HYSYS, ASPEN PLUS and COMSOL in designing and simulation of chemical processes and its applications. In addition to data generation, analysis, thermodynamic modeling, and process economic analysis using simulation software.	
8	**CHEN 484 Process Integration and Optimization (3:0:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Construct and analyze process flow diagrams for sustainable design that enhance yield, improve quality, advance inherent safety, and increase profitability. [2, 6] **CLO 2:** Estimate profitability of process through proper cost estimation and process economics. [1] **CLO 3:** Implement different integration techniques for process optimization and retrofit. [1, 7] **CLO 4:** Apply linear and nonlinear optimization techniques for process	Process integration and optimization is an important area that focus on improving the efficiency of process plants, thereby improving profitability while reducing resource consumption and waste generation. Accordingly, the chemical engineering program is proposing introducing this course to equip students with knowledge related to process integration and enhance their ability to optimize chemical

				integration. [1, 7] **CLO 5:** Use of simulation software for process optimization. [2, 7]	engineering processes.A39:G43
		Credit Hours	None	3	
		Co- requisites	None	CHEN 483	
		Pre - requisites	None	CHEN 481	
		Course Description	None	This course aims to introduce the concepts, tools and applications of heat and mass integration using pinch technology and application of linear and nonlinear programming for process integration and optimization. In addition to application of heat and mass integration in process design and retrofit. Graphical and mathematical procedures are emphasized for analyzing process performance. Case studies and examples will be used to	

				illustrate how process integration helps in optimizing actual industrial processes.	
9	**CHEN 464 Industrial Catalysis (3:0:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Formulate reaction mechanisms and derive correlations between catalytic properties and performance. [1] **CLO 2:** Illustrate various catalytic synthesis and characterization techniques. [1, 6] **CLO 3:** Integrate principles of chemical thermodynamics, reaction kinetics, interfacial and diffusional mass transfer to develop mathematical models of multi-phase reactors. [1, 2] **CLO 4:** Design catalytic reactors to meet productivity targets. [2, 7] **CLO 5:** Compare different catalysts based on factors	Considering that most of the chemical engineering industries involve the presence of catalytic processes and due to the importance of catalysis, the chemical engineering program is proposing introducing new technical elective course related to industrial catalysis. This course designed to equip the CHE students with knowledge related to developing of catalyst for various chemical industrial processes and designing catalytic systems.

				including activity, selectivity, cost, and stability. [1, 6]	
		Credit Hours	None	3	
		Co- requisites	None	None	
		Pre - requisites	None	CHEN 351	
		Course Description	None	This course will provide a comprehensive overview of homogenous and heterogeneous catalytic science and technology for different chemical engineering industry. Course modules will cover the preparation and characterization of catalyst systems, kinetics and mechanism of catalyzed reactions including	

				adsorption, desorption and surface reactions. Emphasis will be placed on understanding the design, synthesis, characterization and industrial application of various catalytic systems.	
10	**CHEN 476 Fundamentals of Nanotechnology (3:0:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Recognize the basic concepts of Nanotechnology and Nanomaterials. [1, 7] **CLO 2:** Investigate the various synthesis techniques including chemical, physical and biological methods. [1] **CLO 3:** Discover various characterization techniques used for determining properties of nanomaterials. [1, 7] **CLO 4:** Assess the application of nanotechnology in diverse engineering fields. [1, 7] **CLO 5:** Design experiment for the synthesis of Nanoparticles and Nanofluids. [2, 6]	The chemical engineering program proposing introducing this course as one of the program technical elective courses to equip the CHE students with knowledge related to the new areas on chemical engineering discipline.
		Credit Hours	None	3	
		Co- requisites	None	None	

		Pre - requisites	None	CHEN 351 & CHEN 371	
		Course Description	None	The general goal of the course is to provide an introduction to and an overview of nanotechnology (NT). The course handles the basics of nanomaterials and nanotechnology and its applications. It will provide an insight into the chemical materials and fabrication lines nowadays used in nanotechnology. The course will also demonstrate how the applications of NT will influence science of tomorrow and will change many sides of our life as well as discussing the impact of NT on our society.	
11	**CHEN 486 Data Science in Chemical Engineering (3:0:0)**	Course Learning Outcomes (CLOs)	None	**CLO 1:** Employ different techniques for collecting, cleaning, and clustering big data to be modeled and visualized. [1, 6] **CLO 2:** Use applied statistics, probability and regression methods to characterize and visualize data. [1, 6] **CLO 3:** Apply fundamental machine learning techniques	The chemical engineering program is proposing introducing this course as one of the program technical elective courses to equip the CHE students with knowledge related to the new areas on chemical engineering discipline and to support students to acquire new skills related

				to train, test and validate data. [6, 7] **CLO 4:** Use data science and machine learning tools to design, model and solve chemical engineering problems. [2, 7]	to data science and artificial intelligent application on chemical engineering.
		Credit Hours	None	3	
		Co- requisites	None	Senior Standing	
		Pre - requisites	None	ENGR 200	
		Course Description	None	This course is an introduction to data science and machine learning with specific focus on chemical engineering applications. It will cover data access and management, databases and data warehousing, statistical methods including classification and clustering, time series, various regression methods and multivariate statistics and data visualization. In addition to the use of artificial intelligence and machine	

				learning to solve chemical engineering problems.	

Program	Course	Equivalent Course	Notes
Civil and Infrastructure Engineering	CIEN 250 (Engineering in Global Environment) – 2 credits	ENGR 210 (Sustainability in Engineering) – 2 credits	ENGR 210 will replace CIEN 250 in the CIEN program starting Fall 2023. Equivalency is needed for students who follow earlier versions of the CIEN program.

Additional Notes: Both courses are similar and cover topics in sustainability but ENGR 210 will be offered to multiple engineering programs

#	Program/Course	Nature of Change	Old	New	Justification
1	**Mechanical Engineering/ Engineering Materials**	Course Learning Outcomes (CLOs)			Industrial Engineering Program was phased out. Consequently, all the common courses offered previously by the industrial engineering program will be offered by the mechanical engineering program with mechanical engineering code.
		Credit Hours			
		Pre - requisites			
		Course Description			
		Course Code	IENG 231	MENG 241	
2	**Mechanical Engineering/ Engineering Materials Lab.**	Course Learning Outcomes (CLOs)			Industrial Engineering Program was phased out. Consequently, all the common courses offered previously by the industrial engineering program will be offered by the mechanical engineering program with mechanical engineering code.
		Credit Hours			
		Pre - requisites			
		Course Description			
		Course Code	IENG 232	MENG 242	
3	**Mechanical Engineering/ Manufacturing Processes**	Course Learning Outcomes (CLOs)			Industrial Engineering Program was phased out. Consequently, all the common courses offered previously by the industrial engineering program will be offered by the mechanical engineering program with mechanical engineering code. The department submitted a substantive change to reduce the number of mechanical engineering program credits to 133. However, the academic council recommended retaining
		Credit Hours	2	3	
		Pre - requisites			
		Course Description			
		Course Code	IENG 311	MENG 312	

					134 credits for the program. As a result, the number of credits assigned to the Manufacturing process course was changed from 2 to 3 credits.
4	**Mechanical Engineering/ Manufacturing Processes Lab.**	Course Learning Outcomes (CLOs)			Industrial Engineering Program was phased out. Consequently, all the common courses offered previously by the industrial engineering program will be offered by the mechanical engineering program with mechanical engineering code.
		Credit Hours			
		Pre - requisites			
		Course Description			
		Course Code	IENG 313	MENG 313	
5	**Mechanical Engineering/ Engineering Economy**	Course Learning Outcomes (CLOs)			Industrial Engineering Program was phased out. Consequently, all the common courses offered previously by the industrial engineering program will be offered by the mechanical engineering program with mechanical engineering code.
		Credit Hours			
		Pre - requisites			
		Course Description			
		Course Code	IENG 321	MENG 323	

AY 22-23. 5.5 Internship Pre-requisite:

- ✓ The Provost pointed out that students are applying for exception since they very close to the required credits needed for registering the internship courses.
- ✓ The members suggested to reduce the completed credit hours required for both internship courses.

➢ The Provost will discuss reducing the credit hours completed for both internship courses with the Chief Strategy and Excellence Officer.

AY 22-23. 5.6 Any other relevant business:

Nil

The meeting was adjourned at 1:30 pm. The minutes of meeting will be sent soon.