

**University Curriculum Committee
September 21, 2023 Meeting Minutes**

The University Curriculum Committee met on **Thursday, September 21** at 3:00 p.m. via Zoom Meeting.

Members Present:

Julie Baker	Darron Smith	Martin Sheehan	Christy Killman
Ben Mohr	Jennifer Shank	Sharon Huo	Jeremy Wendt, Chair
Linda Null	Jeff Boles	Barbara Jared	Kumar Yelamarthi
Brandi Fletcher	Wesley Pech	Brittany Copley	Jerry Gannod
Jeff Roberts	Colin Hill	Julie Galloway	James Baier
Kent Dollar	Steven Hayslette	Michael Hoane	Matthew Smith
Robby Sanders	Jeannette Luna	Thomas Payne	Curtis Armstrong
Lisa Zagumny	Michael Allen	Melinda Anderson	Mohan Rao
Rita Barnes	Stephen Robinson	Sean Alley	Frankie Wolford, Student
Kashaina Nucum, Student	Braxton Westbrook, Student		

Members Absent:

Jeff Roberts	Maj. Benjamin Sweeney	Sharon Holderman	Scott Christen
Steve Frye	Mike Gotcher	Kim Hanna	Karen Lykins
Allen Mackenzie	Lori Maxwell	Richard Rand	Dennis Tennant
Fred Vondra	Chris Wilson	Kim Winkle	Chance Hale, Student

Official Representative(s):

Pooja Patel FOR	Mary Cottrell	David Hajdik FOR	Hayden Mattingly

Guest(s):

Angie Clark	Mary McCaskey	Deborah Yu	

Outline of Proceedings:

1.	UCC	Approval of Agenda	
2.	UCC	Approval of March 23, 2023 Minutes	
3.	CHEM	Prerequisite Changes	
4A.	ME	New Course Additions	
4B.	ME	NAPP- BS in Nuclear Engineering	
5.	MET	Curriculum/Prerequisite Changes	

Proceedings:

Perceiving a quorum, Dr. Jeremy Wendt, Chair of Committee, called the meeting to order at 3:01pm via Zoom.

1. Approval of agenda

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried.

2. Approval of minutes, March 23, 2023

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried.

3. Chemistry

A. Prerequisite Changes.

1. CHEM 1110: General Chemistry I – Lec. 3, Lab 3, Credit 4

From:

Course or Test: MATH 1000, Minimum Grade of D, may not be taken concurrently; or Course or Test: DSPM 0850, minimum grade of C, may not be taken concurrently; or DSPM 4, may not be taken concurrently; or A02 19 to 36, may not be taken concurrently; or S02 350 to 450, may not be taken concurrently.

To:

ACT Math score of 19 or higher; or SAT Math score of 530 or higher; or B or higher in CHEM 1000; or C or higher in MATH 1710; or Accuplacer AQS score of 250-300; or AAF 231 or greater.

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried.

4. Mechanical Engineering

A. New Course Additions.

1. NE 2110: Intro to Nuclear Energy Syst Lec. 3 Credit 3

Prerequisite: PHYS 2120

Course Description: Atomic structure; neutron interactions; reaction rates and nuclear power generation; nuclear fission; fast and thermal neutrons; neutron multiplication factor and reactivity; computing effective multiplication factor; neutron moderation; pressurized water reactors; boiling water reactors; pressurized heavy water reactors; balance-of-plant systems; sodium fast reactors; molten salt reactors; gas-cooled reactors; nuclear plant capacity factor; fusion energy; advanced reactors; nuclear fuel cycle

- 2. NE 2120: Intro Radiological Engg & Detc Lec. 3 Credit 3**
Prerequisite: PHYS 2120
Course Description: Radioactive decay and decay mechanisms; charged particles and energy transfer; biological effects of radiation, including radiation dose, dose equivalent, quality factors; radiation protection and exposure limits; radiation detection, radiation dosimetry, and radiation shielding; benefits and risks of radiation, and communication with the public.
- 3. NE 3210: Nuclear React Safety & Analys Lec. 3 Credit 3**
Prerequisite: NE 2110
Course Description: Nuclear plant systems in PWRs, BWRs, SFRs and GCRs; safety systems and emergency core cooling systems in PWRs, BWRs, PHWRs & GCRs; nuclear reactor safeguard systems; defense-in-depth design; nuclear reactor accident scenarios; design-basis accidents (DBA) and beyond DBA; examples of major commercial reactor accidents (TMI-2, Chernobyl, Fukushima); indications of transients in operating reactors and emergency shutdown; regulatory issues related to reactor safety; study of reactor transients; elements of probabilistic risk assessment (PRA); thermal hydraulic and severe accident computer codes recommended by the NRC.
- 4. NE 4110: Nuclear Engg Laboratory I Lec. 2 Lab. 2 Credit 3**
Prerequisite: NE 2110 and ECE 2050
Course Description: Radiation detection systems and measurements. Electronic devices associated with measurements. Statistical data analysis. Understand radiation sources, interactions, and various types of detectors. Develop laboratory skills and report writing, with emphasis on presentation of procedures, data, and results.
- 5. NE 4120: Nuclear Engg Lab II Lec. 2 Lab. 2 Credit 3**
Prerequisite: NE 4110 and ECE 2050
Course Description: Basic measurements of process parameters including, temperature, pressure, flow rate, liquid level and machinery vibration. Apply the fundamentals of digital signal processing to extract information from sensor signals, sensor calibration and measurement accuracy. Develop laboratory skills for measurements in a fluid flow loop system and to demonstrate basic heat transfer in a nuclear reactor. Develop report writing skills, with emphasis on laboratory procedures, data acquisition, and results.
- 6. NE 4210: Nuclear React Th & Analysis**
Prerequisite: NE 3210 and ME 3001
Course Description: Nuclear fission, chain reactions, elastic scattering, neutron cross sections, neutron moderation (slowing down), neutron energy spectrum, nuclear data; multiplication factor and reactivity; neutron transport equation; one-speed neutron diffusion model; point reactor kinetics equations and spatial effects in reactor kinetics; reactivity feedback effects; light water reactors and sodium fast reactors; multi-group diffusion theory; calculation of core power distribution.

- 7. NE 4220: Nuclear React Dyn & Control** **Lec. 4 Credit 4**
Prerequisite: NE 4210
Course Description: Nuclear fission, chain reactions, elastic scattering, neutron cross sections, neutron moderation (slowing down), neutron energy spectrum, nuclear data; multiplication factor and reactivity; neutron transport equation; one-speed neutron diffusion model; point reactor kinetics equations and spatial effects in reactor kinetics; reactivity feedback effects; light water reactors and sodium fast reactors; multi-group diffusion theory; calculation of core power distribution.
- 8. NE 4310: Senior Project I** **Lec. 3 Credit 3**
Prerequisite: NE 3210 and NE 4110
Course Description: Principles of engineering design with emphasis on contemporary industrial design processes. Economics analysis with underlying principles related to cost of money and break-even analysis. Project proposal writing, preliminary design, supporting analyses and drawings with bill of materials ready to fabricate during the following semester. Preparation of a standard operating procedure (SOP) document as needed.
- 9. NE 4320: Senior Project II** **Lec. 3 Credit 3**
Prerequisite: NE 4310
Course Description: Design, development, and demonstration as applied to a nuclear energy system component, instrumentation, device. The use of software platforms, equipment needed to complete the design and demonstration, and other tools (such as 3-D printing) should be part of the design tasks. Consider non-nuclear components of a power plant or an experimental system. Preparation of a project final report and presentation are required.
- 10. NE 4410: Senior Seminar** **Lec. 1 Credit 1**
Prerequisite: Senior Standing
Course Description: This course is designed for seniors in Nuclear Engineering. The course focuses on topics related to nuclear energy systems and radiological engineering with emphasis on ongoing activities in the nuclear industry. Students are expected to develop an understanding of engineering ethics, life-long learning, energy independence and others. Presentations by student teams and guest speakers on various topics.
- 11. NE 4510: Intro to Indust Maint Tech** **Lec. 3 Credit 3**
Prerequisite: MATH 3470
Course Description: Principles of reliability and maintainability engineering, and maintenance management. Topics include information extraction from machinery measurements; vibration monitoring and rotating machinery diagnostics; nondestructive testing; lubrication oil analysis; thermography; plant instrumentation for machinery health monitoring and maintenance on demand; establishing a predictive

maintenance program, its evaluation, performance metrics. Presentation by industry experts.

12. NE 4520: Adv Reactors and SMR

Lec. 3 Credit 3

Prerequisite: NE 4210

Course Description: Advantages and disadvantages of advanced reactors, considering cost and construction; advanced reactor marketplace; evolutionary and developmental reactors - light water reactors, pressurized heavy water reactors, gas-cooled reactors, liquid metal reactors, molten salt reactors (MSRs); small modular reactors (SMRs, 20-300 MWe) and micro-reactors (1-20 MWe) for remote deployment; features of SMRs such as small LWRs, GCRs, MSRs; dynamic characteristics of current SMRs under development and construction; IAEA report on small and medium reactors.

13. NE 4900: Special Topics in Nuclear Engg

Lec. 1-3 Credit 1-3

Prerequisite: Senior Standing

Course Description: Special topics of current interest in nuclear engineering that are not covered in existing courses. Because of the impossibility of duplicating the conditions for a special topic, this particular topic may not be repeated for the improvement of a grade.

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried

B. ENAPP Program Submittal: BS in Nuclear Engineering

The College of Engineering in the department of Mechanical Engineering requests the University Curriculum Committee's approval to submit the Expedited New Academic Program Proposal (ENAPP) for the Bachelor of Science (BS) in Nuclear Engineering program to the Tennessee Higher Education Commission (THEC).

The BS in Nuclear Engineering program has undergone comprehensive planning and review, including input from faculty, experts in the field, and external stakeholders. It aligns with the institution's mission and strategic goals, and the college believes it will provide valuable opportunities for students and contribute to the academic offerings of our university.

The program proposal includes essential details, such as the program's objectives, curriculum structure, faculty resources, and anticipated student demand. The college is confident that the BS in Nuclear Engineering program will meet the necessary academic standards and enhance the university's educational offerings.

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried.

5. Manufacturing & Engineering Technology

A. Prerequisite Changes/ New Course Additions/Curriculum Changes

Prerequisite Changes.

1. From:

MET 4250 (5250) - Applied Mechatronics

Lec. 2. Lab. 2. Credit 3.

Prerequisite: MET 3260 or consent of instructor.

Introduction to mechatronic systems; modeling of mixed mechatronic systems; microcontroller programming and interfacing; theory, selection and implementation of sensors and actuators commonly used in mechatronic systems; control architectures and case studies in mechatronic systems. Students enrolled in the 5000-level course will be required to complete additional work as stated in the syllabus.

To:

MET 4250 (5250) - Applied Mechatronics

Lec. 2. Lab. 2. Credit 3.

Prerequisite: ~~MET 3260~~ MET3200 or consent of instructor.

Introduction to mechatronic systems; modeling of mixed mechatronic systems; microcontroller programming and interfacing; theory, selection and implementation of sensors and actuators commonly used in mechatronic systems; control architectures and case studies in mechatronic systems. Students enrolled in the 5000-level course will be required to complete additional work as stated in the syllabus.

2. From:

MET 4220 (5220) - Industrial Automation and Robotics

Lec. 2. Lab. 2. Credit 3.

Prerequisite: MET 3260

Studies in the theory and application of industrial automation relating to manufacturing. Students enrolled in the 5000-level course will be required to complete additional work as stated in the syllabus.

To:

MET 4220 (5220) - Industrial Automation and Robotics

Lec. 2. Lab. 2. Credit 3.

Prerequisite: ~~MET 3260~~ MET3200 or consent of instructor

Studies in the theory and application of industrial automation relating to manufacturing. Students enrolled in the 5000-level course will be required to complete additional work as stated in the syllabus.

3. From:

MET3703 – Manufacturing Cost Estimating

Catalog Data: Lec. 2, Lab 2, Cr. 3

Prerequisite: MET 2615 and MET 2065 Junior Standing

This is an experiential learning course where the students participate in solving an industrial problem. This course requires the application of computer-aided design, bill of materials, manufacturing processes, process design, writing a report, and presentation of the results.

To:

MET3703 – Manufacturing Cost Estimating

Catalog Data: Lec. 2, Lab 2, Cr. 3

Prerequisite: ~~MET 2615 and MET 2065~~ **Junior Standing**

This is an experiential learning course where the students participate in solving an industrial problem. This course requires the application of computer-aided design, bill of materials, manufacturing processes, process design, writing a report, and presentation of the results.

4. From:

MET3713 – Methods Design and Work Measurement

Catalog Data: Lec. 2, Cr. 2, Cr. 3

Prerequisite: MET 2000, MET 2065, and MET 2615

Introduction to concepts and the practice of methods improvement and work measurement for lean manufacturing.

To:

MET3713 – Methods Design and Work Measurement

Catalog Data: Lec. 2, Cr. 2, Cr. 3

Prerequisite: ~~MET 2000, MET 2065, and MET 2615~~ **Junior Standing**

Introduction to concepts and the practice of methods improvement and work measurement for lean manufacturing.

5. From:

MET 3003 - Principles of Metal Casting

Lec. 2 Lab. 2. Credit 3.

Prerequisite: ENGR 1110, MET 1100 and ME 3010 or MET 3100. MET 3010 or MET 3100 may be taken concurrently.

Principles of molding and casting aluminum, brass and gray iron. Use of cores, patterns, machine molding, and solidification modeling.

To:

MET 3003 - Principles of Metal Casting

Lec. 2 Lab. 2. Credit 3.

Prerequisite: ENGR 1110, ~~MET 1100~~ **MET1115** and ME 3010 or MET 3100. MET 3010 or MET 3100 may be taken concurrently.

Principles of molding and casting aluminum, brass and gray iron. Use of cores, patterns, machine molding, and solidification modeling.

6. From:

MET 3100 - Applied Physical Metallurgy

Lec. 2. Lab. 2. Credit 3.

Prerequisite: MET 1100, CHEM 1010 or CHEM 1110.

A study of the relationships between chemical compositions and structures on the properties of ferrous, non-ferrous metals and alloys used in manufacturing industry.

To:

MET 3100 - Applied Physical Metallurgy

Lec. 2. Lab. 2. Credit 3.

Prerequisite: ~~MET 1100~~ MET1115, CHEM 1010 or CHEM 1110.

A study of the relationships between chemical compositions and structures on the properties of ferrous, non-ferrous metals and alloys used in manufacturing industry.

7. From:

MET 2065 - Metal Manufacturing Technology

Lec. 1. Lab. 2. Credit 2.

Prerequisite: ENGR 1110, MET 1100 and MATH 1730 or MATH 1710 and MATH 1720 or MATH 1910.

Machine tool functions, use of hand tools, precision measurement, welding and fabrication of metals.

To:

MET 2065 - Metal Manufacturing Technology

Lec. 1. Lab. 2. Credit 2.

Prerequisite: ENGR 1110, ~~MET 1100~~ MET1115 and MATH 1730 or MATH 1710 and MATH 1720 or MATH 1910.

Machine tool functions, use of hand tools, precision measurement, welding and fabrication of metals.

New Course Additions.

1. MET 3620 Intr to Industrial IoT Sys

Lec. 2. Lab 2. Credit 3.

Prerequisite: ENGR 1120, MET 3200

Introduction to Industrial Internet of Things (IIoT) devices, networks, and standards in the context of industrial automation systems.

Topics include: hardware, architecture, protocols, standards, and security practices.

2. MET 4120 Process and Control Appls

Lec. 2. Lab 2. Credit 3.

Prerequisite: MET 3270

Proportional, Integral, Derivative (PID) Control, loop modeling, transfer functions, PID design, implementation and tuning. Course laboratories focus on implementing and tuning systems using industry-grade hardware and devices.

3. MET 4320 Mixed Reality in Mfg

Lec. 2. Lab 2. Credit 3.

Prerequisite: MET 3620

Mixed Reality (MR) application in industrial IoT (IIoT)-based manufacturing systems, superimposing digital content onto physical systems, integrating data from smart and connected manufacturing production operations, processes, and machines.

4. MET 4420 Intr to Additive Mfg

Lec. 2. Lab 2. Credit 3.

Prerequisite: MET 3620

Additive manufacturing process and material selection, design for additive manufacturing, support structure generation, printing process planning, and quality control techniques, such as monitoring, inspection, and surface modification.

5. MET 4520 Autonomous Robots in Mfg

Prerequisite: MET 4320

Lec. 2. Lab 2. Credit 3.

Robot cognition with application of robot systems in unstructured manufacturing environments, intelligent robotics, machine vision, and human-robot interaction with particular emphasis on applications for smart manufacturing.

Curriculum Changes.

BS in Engineering Technology

From:

Junior Year

Second Semester

COMM 2025 - Fundamentals of Communication Credit: 3. or

PC 2500 - Communicating in the Professions Credit: 3.

ECON 3610 - Business Statistics I Credit: 3.

MET 3003 - Principles of Metal Casting Credit: 3.

MET 3200 - Applied Electricity and Electronics Credit: 3.

MET 3403 - Applied Machine Elements Credit: 3.

Total: 15

To:

Junior Year

Second Semester

COMM 2025 - Fundamentals of Communication Credit: 3. or

PC 2500 - Communicating in the Professions Credit: 3.

ECON 3610 - Business Statistics I Credit: 3. **Or MATH 3070 – Statistical Methods I Credit: 3.**

MET 3003 - Principles of Metal Casting Credit: 3.

MET 3200 - Applied Electricity and Electronics Credit: 3.

MET 3403 - Applied Machine Elements Credit: 3.

Total: 15

MET 3060, (MET 3260, and ECE 3270), MET 4250 (5250) and select two courses from: – MET 3460, MET 4000,

~~MET 4060 (5060), MET 4210 (5210), MET 4220 (5220), MET 4300 (5300), MET 4400 (5400),~~

~~MET 4450 (5450), MET 4500 (5500), MET 4550 (5550), MET 4600 (5600), MET 4650 (5650),~~

~~MET 4700, MET 4750 (5750), MET 4990 (5990).~~

BSET Concentration in Mechatronics Engineering Technology

From:

Select two courses from MET 4000, MET 4210 (5210), MET 4220 (5220), and MET 4990 (5990)

To:

Select two courses from MET 4120, MET 4220 (5220), and MET 4990 (5990)

Motion to approve. Julie Baker

Second. Kumar Yelamarthi

Vote. Motion carried.

Other Such Matters:

1. SACSCOC Reaffirmation in 2026: Faculty Credential Review

No other such matters being presented, the meeting was adjourned at 4:10pm.