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| For Academic Affairs and Research Use Only | |
| CIP Code: |  |
| Degree Code: |  |

**New Course Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

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| **[X] New Course or [ ]Experimental Course (1-time offering) (Check one box)** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

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| Dr. David Jeong 4/10/2019 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Joan Burcham 4/10/2019 **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| Jason Stewart 4/10/2019 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Dr. Yeonsang Hwang 4/10/2019 **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

1. Contact Person (Name, Email Address, Phone Number)

Joan Burcham, dburcham@astate.edu, 870-972-4838

2. Proposed Starting Term and Bulletin Year

Fall 2019 (2019-2020 Bulletin Year)

3. Proposed Course Prefix and Number (Confirm that number chosen has not been used before. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*. )

EGRM 6053

4. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Engineering Economy

5. Brief course description (40 words or fewer) as it should appear in the bulletin.

Methodical assessment of the economic benefits and expenditures of projects concerning engineering design and analysis, including economic analysis for decision-making among contending opportunities.

6. Prerequisites and major restrictions. (Indicate all prerequisites. If this course is restricted to a specific major, which major. If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

1. **NO** Are there any prerequisites?
   1. If yes, which ones?

Enter text...

* 1. Why or why not?

The content of the course does not require any prerequisite knowledge

1. **NO** Is this course restricted to a specific major?
   1. If yes, which major? Enter text...

7. Course frequency(e.g. Fall, Spring, Summer). *Not applicable to Graduate courses.*

N/A

8. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture

9. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])

Standard letter

10. **NO** Is this course dual listed (undergraduate/graduate)?

11. **NO** Is this course cross listed?

*(If it is, all course entries must be identical including course descriptions. Submit appropriate documentation for requested changes. It is important to check the course description of an existing course when adding a new cross listed course.)*

**11.1** – If yes, please list the prefix and course number of cross listed course.

Enter text...

**11.2** – **Yes / No** Are these courses offered for equivalent credit?

Please explain. Enter text...

12. **NO** Is this course in support of a new program?

a. If yes, what program?

Enter text...

13. **NO** Does this course replace a course being deleted?

a. If yes, what course?

Enter text...

14**. NO** Will this course be equivalent to a deleted course?

a. If yes, which course?

Enter text...

15. **YES** Has it been confirmed that this course number is available for use?

*If no: Contact Registrar’s Office for assistance.*

16. **NO** Does this course affect another program?

If yes, provide confirmation of acceptance/approval of changes from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

**Course Details**

17. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

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| **Session** | **Topics** |
| **Weeks 1-2** | Introduction to Engineering Economy; The Principles of Engineering Economy; Engineering Economy and the Design Process; Using Spreadsheets in Engineering Economic Analysis; Cost Concepts and Design Economics; Cost Terminology; The General Economic Environment; Cost-Driven Design Optimization. |
| **Weeks 3-4** | Cost-estimation Techniques; An Integrated Approach; Selected Estimating Techniques (models); Simple Interest; Compound Interest; The Concept of Equivalence; Notation and Cash-Flow Diagrams and Tables; Relating Present and Future Equivalent Values of Single Cash Flows; Relating a Uniform Series (Annuity) to its Present and Future Equivalent Values; Interest Rates that Vary with Time; Nominal and Effective Interest Rates. |
| **Weeks 5-6** | Determining the Minimum Attractive rate of Return (MARR); The Present Worth Method; the Future Worth Method; The Annual Worth Method; The Internal Rate of Return Method; Basic Concepts for Comparing Alternatives; Useful Lives Are Equal to the Study Period |
| **Weeks 7-8** | Depreciation Concepts and Terminology; The Classical Depreciation Methods; The Modified Accelerated Cost Recovery System; Income Taxes; Marginal Corporate Income Tax; Actual and Real Dollars; Inflation; Interest Rate; Fixed and Responsive Annuities; Differential Price Changes; Foreign Exchange Rates and Purchasing Power Concepts. |
| **Weeks 9-10** | Replacement Analysis; Reasons for Replacement Analysis; Relevant Factors in Replacement Studies; Economic Life of a New Asset and a Defender; Analyzing Public Projects; Self-Liquidating Projects; Multiple-Purpose Projects; Benefit-Cost Ratio Method; Evaluating Independent Projects. |
| **Weeks 11-12** | Breakeven Analysis; Sensitivity Analysis; Multiple Factor Sensitivity Analysis; Sources of Uncertainty; Random Variables Distribution; Discrete Random Variables; Continuous Random Variables; Decision Trees. |
| **Weeks 13-14** | Introduction, Debt Capital; Equity Capital; The Weighted Average Cost of Capital (WACC); Multi-attribute Decisions; Choice of Attributes; Measurement Scale. |

18. Special features (e.g. labs, exhibits, site visitations, etc.)

None

19. Department staffing and classroom/lab resources

1. Will this require additional faculty, supplies, etc.?

Yes – additional faculty resources will be necessary

20. **NO** Does this course require course fees?

*If yes: please attach the New Program Tuition and Fees form, which is available from the UCC website.*

**Course Justification**

21. Justification for course being included in program. Must include:

a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

The ultimate objective is the improvement of students’ knowledge and ability to apply engineering economic principles along with the essentials of professional engineering assessment and registration procedure

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

A principle objective of the course is the provision of essential skills and the comprehension of economics, and accounting concepts and analysis, for applicability in the engineering environment. A subsequent course objective is the enhancement of students’ knowledge and ability in the application of time-money relationships, cash flow, depreciation schedules, and effects of inflation, among others, in solving engineering management problems, and other managerial decision-making in engineering.

c. Student population served.

Graduate students

d. Rationale for the level of the course (lower, upper, or graduate).

Engineering management courses are only offered at the graduate level

**Assessment**

**Relationship with Current Program-Level Assessment Process**

22. What is/are the intended program-level learning outcome/s for students enrolled in this course? Where will this course fit into an already existing program assessment process?

PLO 1: Graduates of the Master of Engineering Management program will be able to identify critical issues, formulate realistic solutions evaluate alternatives and solve engineering management problems.

PLO 2: Graduates of the Master of Engineering Management program will be able to interpret statistical concepts and methods and apply this knowledge to engineering and management problems.

PLO 3: Graduates of the Master of Engineering Management program will use quality control and improvement techniques and apply this knowledge to improve quality in both the manufacturing and service industries.

PLO 4: Graduates of the Master of Engineering Management program will be able to construct deterministic modeling and apply this to engineering management problems including design of experiments.

23. Considering the indicated program-level learning outcome/s (from question #23), please fill out the following table to show how and where this course fits into the program’s continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

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| **Program-Level Outcome 1 (from question #23)** | Graduates of the Master of Engineering Management program will be able to identify critical issues, formulate realistic solutions evaluate alternatives and solve engineering management problems. |
| Assessment Measure | Comprehensive Exam Questions; These questions are dispersed throughout the program’s courses and data is collected annually. |
| Assessment  Timetable | MEM program collects data for one outcome per year; collected data in 16-17, will collect in 19-20 |
| Who is responsible for assessing and reporting on the results? | Faculty teaching in the courses designated for Comprehensive Exam questions and the Program Director |

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| **Program-Level Outcome 2 (from question #23)** | Graduates of the Master of Engineering Management program will be able to interpret statistical concepts and methods and apply this knowledge to engineering and management problems. |
| Assessment Measure | Comprehensive Exam Questions; These questions are dispersed throughout the program’s courses and data is collected annually. |
| Assessment  Timetable | MEM program collects data for one outcome per year; collected data in 17-18, will collect in 20-21 |
| Who is responsible for assessing and reporting on the results? | Faculty teaching in the courses designated for Comprehensive Exam questions and the Program Director |

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| **Program-Level Outcome 3 (from question #23)** | Graduates of the Master of Engineering Management program will use quality control and improvement techniques and apply this knowledge to improve quality in both the manufacturing and service industries. |
| Assessment Measure | Comprehensive Exam Questions; These questions are dispersed throughout the program’s courses and data is collected annually. |
| Assessment  Timetable | MEM program collects data for one outcome per year; will collect in 18-19 |
| Who is responsible for assessing and reporting on the results? | Faculty teaching in the courses designated for Comprehensive Exam questions and the Program Director |

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| **Program-Level Outcome 4 (from question #23)** | Graduates of the Master of Engineering Management program will be able to construct deterministic modeling and apply this to engineering management problems including design of experiments. |
| Assessment Measure | Comprehensive Exam Questions; These questions are dispersed throughout the program’s courses and data is collected annually. |
| Assessment  Timetable | MEM program collects data for one outcome per year; will collect in 18-19 |
| Who is responsible for assessing and reporting on the results? | Faculty teaching in the courses designated for Comprehensive Exam questions and the Program Director |

*(Repeat if this new course will support additional program-level outcomes)*

**Course-Level Outcomes**

24. What are the course-level outcomes for students enrolled in this course and the associated assessment measures?

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| **Outcome 1** | Students can solve an engineering management problem and make a managerial decision while taking into account the time value of money. |
| Which learning activities are responsible for this outcome? | Lectures, homework, class participation, and projects. |
| Assessment Measure | Comprehensive final exam question(s) |

*(Repeat if needed for additional outcomes)*

**Bulletin Changes**

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| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Follow the following guidelines for indicating necessary changes.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

**Engineering Management (EGRM)**

**EGRM 6003. Engineering Statistics** Basic concepts and methods of descriptive and inferential statistics including graphical techniques, measures of central tendency and dispersion, interval estimation, hypothesis and goodness of fit tests, comparisons of two populations, and analysis of variance. Prerequisite MATH 2204.

**EGRM 6013. Quality Control and Improvement** A brief review of the evolution of quality control and improvement theory particularly as influenced by key pioneers such as Deming, Juran, and Taguchi. Extensive coverage of selected quality improvement techniques includes statistical process control, inspection sampling, and design of experiments. Prerequisites, EGRM 6003.

**EGRM 6023. Engineering Management I** Basic principles and practices of engineering management activities including planning, organization, leadership, controlling, motivating, ethics, communications, and decision making; group research of special topics with written and oral presentations is required. This course is restricted to graduate students majoring in Engineering Management.

**EGRM 6033. Engineering Management II** Principles and practices of engineering management including marketing management, globalization, time management, forecasting, finance, cost, accounting, managing technology, engineering management in the new millennium; invited lectures and seminars covering projects of interest to civil, electrical, mechanical, and manufacturing engineers in management positions. Prerequisite, MBA 500V, MBA 501V, and EGRM 6023. This course is restricted to graduate students majoring in Engineering Management.

**EGRM 6043. Operations Research** Quantitative techniques for decision making; break-even analysis, economic models, Gaussian distributions, inventory control, production models, and mathematical programming. Prerequisite: EGRM 6003, Engineering Statistics.

***EGRM 6053. Engineering Economy Methodical assessment of the economic benefits and expenditures of projects concerning engineering design and analysis, including economic analysis for decision-making among contending opportunities.***

***EGRM 6063. Engineering Law and Ethics Introduction and application of legal concepts relating to the field of engineering management, including general principles, contracts, torts, real property, agency, intellectual property, product liability and safety, and professional legal ethics.***

**EGRM 6073. Special Problems in Engineering Management** A capstone, project-based course consisting of an investigation of an engineering management topic approved by the faculty; weekly project meetings, a formal engineer’s log book of activities, progress reports, oral presentation, and a comprehensive written report are required. ~~Prerequisite, EGRM 6033.~~ This course is restricted to graduate students in Engineering Management ~~and can only be taken during the first semester prior to graduation~~.

***EGRM 6083. Project Management for Engineers Fundamentals of project management for engineering and information systems projects based on the principles established by the Project Management Institute's Project Management Body of Knowledge.***

***EGRM 6103. Entrepreneurship for Engineers* *Entrepreneurship and innovation from perspectives at the political, social, and personal levels.***

***EGRM 6113. Engineering Finance and Budgeting Introduction and orientation to financial matters that concern engineers, with an emphasis on financial statements, cash flows, net present value calculations, and capital budgeting.***

***EGRM 6123. Human Resource Management for Engineers*  *Introduction to the strategic application of human resource management in an organization, including human resource leadership, e-recruitment strategies, equal employment selection, employee retention and turnover, performance management, employment law, diversity and global talent management.***