**New York City College of Technology, CUNY**

**Department of Computer Engineering Technology**

**Proposal for New Course**

**MECH 3501 Quality Control**

**Sept. 29, 2017**

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 New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | Proposal for new course: MECH 3501 Quality Control |
| **Date** | Sept. 29, 2017 |
| **Major or Minor** | Major |
| **Proposer’s Name** | Angran Xiao |
| **Department** | Mechanical Engineering Technology |
| **Date of Departmental Meeting in which proposal was approved** | 11/16/2016 |
| **Department Chair Name** | Sidi Berri |
| **Department Chair Signature and Date** | 9/24/17 |
| **Academic Dean Name** | Kevin Hom |
| **Academic Dean Signature and Date** |  |
| **Brief Description of Proposal**(Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | Department of Mechanical Engineering Technology (MET) proposes MECH 3501 Quality Control, as a new required course in its BTech MECH curriculum. This course will replace MECH 3500 Computer Programming and Applications.  |
| **Brief Rationale for Proposal**(Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).  | Replacing MECH 3500 with MECH 3501 is an important step towards continuous curriculum improvement after the department was accredited by ABET in Fall 2014. Currently, MECH3500 covers topics in computer programming (MATLAB) and quality control. Topics in computer programming (MATLAB) are covered in MECH1240 Computer Applications in Mechanical Engineering Tech. MECH 3501 will focus on quality control applied to Mechanical Engineering Technology.The BTech MECH curriculum does not have a Quality Control class. Any industry, more or less, practices quality control in order to deliver products that meet or exceed customers’ expectations. Even in the entry level licensure exam (other disciplines), about 8%~9% of the questions are related to quality control. It is essential for our students to understand concepts related to the management of quality assurance systems and quality improvement programs, and master the techniques currently used in the industry. |
| **Proposal History**(Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | 9/29/2017 First submission, new proposal.10/16/2017 Revision, added 1. emails of consulting EET and CET departments about this new course
2. minor curriculum modification form that changes the pre-req of MECH 4860, which had MECH 3500 as a pre-req.
3. Table of Content updated showing different items in the Appendix.

11/25/2017 Revision, addressed subcommittee’s comments. Please refer to 17-16 New Course MECH 3501 Quality Control V3\_Response.pdf.12/12/2017 Revision, meet with Bonne August, Sidi Berri, Pamela Brown, Kim Cardascia, Randall Hannum, Kevin Hom, Robert Polchinski, Mohammad Razani, addressed concerns in course description, pre/co request, etc. 2/28/18 Revision, added short statement explaining why MAT1475 is pre-req.3/21/18 Revision, modified course objectives and outlines to address concerns from Math Department |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**ALL PROPOSAL CHECK LIST**

|  |  |
| --- | --- |
| Completed CURRICULUM MODIFICATION FORM including: |  |
| * Brief description of proposal
 | **Y** |
| * Rationale for proposal
 | **Y** |
| * Date of department meeting approving the modification
 | **Y** |
| * Chair’s Signature
 | **Y** |
| * Dean’s Signature
 | **Y** |
| Evidence of consultation with affected departmentsList of the programs that use this course as required or elective, and courses that use this as a prerequisite. | **Y** |
| Documentation of Advisory Commission views (if applicable). | **N/A** |
| Completed [Chancellor’s Report Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Chancellor_Report_Quick_Reference_Guide1.doc). | **Y** |

**EXISTING PROGRAM MODIFICATION PROPOSALS**

|  |  |
| --- | --- |
| Documentation indicating core curriculum requirements have been met for new programs/options or program changes.  | **N/A** |
| Detailed rationale for each modification (this includes minor modifications) | **N/A** |

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | Quality Control |
| **Proposal Date** | Sept. 29, 2017 |
| **Proposer’s Name**  | Angran Xiao |
| **Course Number** | MECH 3501 |
| **Course Credits, Hours** | 2 Class hours, 2 Lab Hours, 3 Credits |
| **Course Pre-Requisites** | MAT 1475, MECH1240, MECH 2333 |
| **Catalog Course Description** | This course presents the fundamental coverage of product quality control. Focused on data acquisition and analysis using quantitative techniques related to the management of quality assurance systems and quality improvement programs. Topics include process capability, control charts, acceptance sampling, quality engineering and quality design. |
| **Brief Rationale**Provide a concise summary of why this course is important to the department, school or college. | Replacing MECH 3500 with MECH 3501 is an important step towards continuous curriculum improvement after the department was accredited by ABET in Fall 2014. Currently, MECH3500 covers topics in computer programming (MATLAB) and quality control. Topics in computer programming (MATLAB) are covered in MECH1240 Computer Applications in Mechanical Engineering Tech. MECH 3501 will focus on quality control applied to Mechanical Engineering Technology.The BTech MECH curriculum does not have a Quality Control class. Any industry, more or less, practices quality control in order to deliver products that meet or exceed customers’ expectations. Even in the entry level licensure exam (other disciplines), about 8%~9% of the questions are related to quality control. It is essential for our students to understand concepts related to the management of quality assurance systems and quality improvement programs, and master the techniques currently used in the industry.The mathematics needed for this class is mostly Algebra. It also needs fundamentals of differentiation and integration, which are covered in MAT 1475 Calculus I. Besides, it requires students to have basic knowledge of Statistics and Probability, which are covered in 2 to 3 weeks/lectures in MAT 1272 Statistics. MECH3501 is mostly focused on the use of these mathematical theories in problems of Quality Control related to Engineering Technology. Students will learn how to apply Quality Control to fields such as Manufacturing, CAD/CAM, Computer Numerical Control and Robotics. The new proposed course includes 4 weeks/lectures on Statistics and Probability with applications to mechanical engineering and quality control. Therefore, we believe MAT 1475 is an appropriate pre-req to ensure that students are prepared for this class. A full statistics class is unnecessary and will overburden our students.  |
| **CUNY – Course Equivalencies**Provide information about equivalent courses within CUNY, if any. | Not offered in any CUNY colleges |
| **Intent to Submit as Common Core**If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | N/A |
| **For Interdisciplinary Courses:*** Date submitted to ID Committee for review
* Date ID recommendation received

- Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | N/A |

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **Y** |
| * Title, Number, Credits, Hours, Catalog course description
 | **√** |
| * Brief Rationale
 | **√** |
| * CUNY – Course Equivalencies
 | **√** |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | **√** |
| **Course Outline** Include within the outline the following. | **Y** |
| Hours and Credits for Lecture and LabsIf hours exceed mandated Carnegie Hours, then rationale for this | **√** |
| Prerequisites/Co- requisites | **√** |
| Detailed Course Description | **√** |
| Course Specific Learning Outcome and Assessment Tables* Discipline Specific
* General Education Specific Learning Outcome and Assessment Tables
 | **√** |
| Example Weekly Course outline | **√** |
| Grade Policy and Procedure | **√** |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | **√** |
| Library resources and bibliography | **√** |
| **Course Need Assessment.** Describe the need for this course. Include in your statement the following information. | **Y** |
| Target Students who will take this course. Which programs or departments, and how many anticipated?Documentation of student views (if applicable, e.g. non-required elective). | **√** |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | **√** |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | **√** |
| Where does this course overlap with other courses, both within and outside of the department? | **√** |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | **√** |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**Describe how this course is designed.  | **Y** |
| Course Context (e.g. required, elective, capstone) | **√** |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | **√** |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | **√** |
| How does this course support Programmatic Learning Outcomes? | **√** |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | N/A |
| **Additional Forms for Specific Course Categories** | **N/A** |
|  [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
|  Interdisciplinary Committee Recommendation (if applicable and if received)\* \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development)  |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | **N/A** |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

Chancellor's Report Section AIV: New Courses

|  |  |
| --- | --- |
| **Department(s)** | Mechanical Engineering Technology |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial**  |
| **Subject Area** | Mechanical Engineering Technology |
| **Course Prefix** | MECH |
| **Course Number** | 3501 |
| **Course Title** | Quality Control |
| **Catalog Description** | This course presents fundamental coverage of product quality control. Focused on data acquisition and analysis using quantitative techniques related to the management of quality assurance systems and quality improvement programs. Topics include process capability, control charts, acceptance sampling, quality engineering and quality design. |
| **Prerequisite** | MAT 1475, MECH1240, MECH 2333 |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 3 |
| **Contact Hours** | 2 Class Hours, 2 Lab Hours |
| **Liberal Arts** | **[ ] Yes  [X] No**  |
| **Course Attribute (e.g. Writing Intensive, etc)** |  |
| **Course Applicability** |

|  |  |
| --- | --- |
| **[X] Major** |  |
| **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** |
| **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** |
| **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** |
| **[ ] Science** | **[ ] Creative Expression** |  **[ ] Advanced Liberal Arts** |
|  | **[ ] Individual and Society** |  |
|  | **[ ] Scientific World** |  |

 |
| **Effective Term** |  Fall 2018 |

**Rationale:** The BTech MECH curriculum does not have a Quality Control class. Any industry, more or less, practices quality control in order to deliver products that meet or exceed customers’ expectations. Even in the entry-level licensure exam (other disciplines), about 8%~9% of the questions are related to quality control. It is essential for our students to understand concepts related to the management of quality assurance systems and quality improvement programs, and master the techniques currently used in the industry.

The mathematics needed for this class is mostly Algebra. It also needs fundamentals of differentiation and integration, which are covered in MAT 1475 Calculus I. Besides, it requires students to have basic knowledge of Statistics and Probability, which are covered in 2 to 3 weeks/lectures in MAT 1272 Statistics. MECH3501 is mostly focused on the use of these mathematical theories in problems of Quality Control related to Engineering Technology. Students will learn how to apply Quality Control to fields such as Manufacturing, CAD/CAM, Computer Numerical Control and Robotics. The new proposed course includes 4 weeks/lectures on Statistics and Probability with applications to mechanical engineering and quality control. Therefore, we believe MAT 1475 is an appropriate pre-req to ensure that students are prepared for this class. A full statistics class is unnecessary and will overburden our students. **Chancellor's Report Section AIII: Changes in Degree Programs**

**The following revisions are proposed for the BTech in Mechanical Engineering Technology**

**Program: BTech in Mechanical Engineering Technology**

**Program Code: 0925**

**Effective Date: Fall 2018**

|  |  |  |  |
| --- | --- | --- | --- |
| **FROM:**  |  | **To:**  |  |
| **GENERAL EDUCATION COMMON CORE 44-46 CREDITS****I – REQUIRED CORE 1 (4 COURSES, 14-15 CREDITS)**English Composition (2 courses, 6 credits)ENG 1101\* English Composition I ENG 1121\* English Composition II Mathematical and Quantitative Reasoning (1 course, 4 credits)MAT 1275 College Algebra and Trigonometryor higher\* (AAS in Industrial Design Technology)MAT 1375or higher\*, 2 Precalculus  (AAS in Mechanical Engineering Technology)Life and Physical Sciences (1 course, 4-5 credits)PHYS 1433\* General Physics I: Algebra Based orPHYS 1441\* General Physics I: Calculus Based **II – FLEXIBLE CORE\* (6 COURSES, 20-21 CREDITS)**Select two additional courses not met at associate level. World Cultures and Global IssuesAny Approved CourseUS Experience in its DiversityAny Approved CourseIndividual and SocietyAny Approved CourseCreative ExpressionAny Approved CourseScientific WorldPHYS 1434\* General Physics II: Algebra Based  orPHYS 1442\* General Physics II: Calculus Based  (AAS in Mechanical Engineering Technology)MAT 1475 or higher Calculus I  (AAS in Industrial Design Technology)One additional course from any groupMAT 1375 Precalculus or higher\* (AAS in Industrial Design Technology)MAT 1475or higher\* Calculus I  (AAS in Mechanical Engineering Technology)**III – COLLEGE OPTION CREDITS 3 (10 CREDITS)**• One course in Speech/Oral CommunicationAny Approved Course • One interdisciplinary Liberal Arts and Sciences courseAny Approved Course • Additional liberal arts credits to reach a minimum of 42 creditsin general education. In meeting their general education requirements overall, students must take at least one advanced liberal arts course 5 or two sequential courses in a foreign language.MAT 1575or higher Calculus II Writing Intensive RequirementStudents at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.**PROGRAM-SPECIFIC DEGREE REQUIREMENTS****Associate-Level Courses (33-36 credits)**MAT 1375or higher 2  Precalculus PHYS 1433 General Physics I: Algebra Based orPHYS 1441 General Physics I: Calculus Based PHYS 1434 General Physics II: Algebra Based orPHYS 1442 General Physics II: Calculus Based MAT 1475or higher Calculus I Additional Required Courses for Students with anAAS in Industrial Design Technology: 4 (7 credits)MAT 1475 or higher Calculus I MECH 2333 Strength of Materials II PHYS 1434 General Physics II: Algebra Based orPHYS 1442 General Physics II: Calculus Based **Baccalaureate-Level Courses (36-41 credits)**~~MECH 3500 Computer Programming and Applications~~MECH 3510 Advanced Solid Modeling II MECH 3600 Mechanical Measurements and  Instrumentation MECH 3650 Advanced Strength of Materials MECH 4700 Fluid Mechanics MECH 4730 Finite Element Methods MECH 4760 Vibration and Advanced Dynamics MECH 4850 Senior Design Project MECH 4860 Project Management 4 MAT 1575 Calculus II or higher MAT 2680 Differential Equations 5 In addition to the above, students must complete 12 credits from one of the three concentrations below. Students can substitute a course from a different concentration with the permission of a faculty advisor.Industrial Design ConcentrationMECH 3520 Rapid Prototyping MECH 3550 Simulation and Visualization MECH 3610 Product Design I MECH 4710 Product Design II MECH 4800 Advanced 3-Dimensional Animation Manufacturing Systems ConcentrationMECH 3530 Advanced Engineering Materials MECH 3540 Manufacturing Systems MECH 3620 Advanced Manufacturing Processes MECH 4720 Plastics Product Manufacturing MECH 4820 Computer-Integrated Manufacturing Robotics ConcentrationMECH 3572 Embedded Systems and Applications in  Robotics MECH 3672 Actuators and Sensors Application in RoboticsMECH 4772 Control Systems in Robotics MECH 4872 Robotic Systems Design and Applications **TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES** **TOTAL NYSED LIBERAL ARTS AND SCIENCE CREDITS** **TOTAL CREDITS REQUIRED FOR THE DEGREE**  | 334456-8454\*4334Met as GenEdMet as GenEdMet as GenEdMet as GenEdMet as GenEd34-5333333332Met as GenEd333333333333333**77****44-46****121-123** | **GENERAL EDUCATION COMMON CORE 44-46 CREDITS****I – REQUIRED CORE 1 (4 COURSES, 14-15 CREDITS)**English Composition (2 courses, 6 credits)ENG 1101\* English Composition I ENG 1121\* English Composition II Mathematical and Quantitative Reasoning (1 course, 4 credits)MAT 1275 College Algebra and Trigonometryor higher\* (AAS in Industrial Design Technology)MAT 1375or higher\*, 2 Precalculus  (AAS in Mechanical Engineering Technology)Life and Physical Sciences (1 course, 4-5 credits)PHYS 1433\* General Physics I: Algebra Based orPHYS 1441\* General Physics I: Calculus Based **II – FLEXIBLE CORE\* (6 COURSES, 20-21 CREDITS)**Select two additional courses not met at associate level. 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In meeting their general education requirements overall, students must take at least one advanced liberal arts course 5 or two sequential courses in a foreign language.MAT 1575or higher Calculus II Writing Intensive RequirementStudents at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.**PROGRAM-SPECIFIC DEGREE REQUIREMENTS****Associate-Level Courses (33-36 credits)**MAT 1375or higher 2  Precalculus PHYS 1433 General Physics I: Algebra Based orPHYS 1441 General Physics I: Calculus Based PHYS 1434 General Physics II: Algebra Based orPHYS 1442 General Physics II: Calculus Based MAT 1475or higher Calculus I Additional Required Courses for Students with anAAS in Industrial Design Technology: 4 (7 credits)MAT 1475 or higher Calculus I MECH 2333 Strength of Materials II PHYS 1434 General Physics II: Algebra Based orPHYS 1442 General Physics II: Calculus Based **Baccalaureate-Level Courses (36-41 credits)**MECH 3501 Quality ControlMECH 3510 Advanced Solid Modeling II MECH 3600 Mechanical Measurements and  Instrumentation MECH 3650 Advanced Strength of Materials MECH 4700 Fluid Mechanics MECH 4730 Finite Element Methods MECH 4760 Vibration and Advanced Dynamics MECH 4850 Senior Design Project MECH 4860 Project Management 4 MAT 1575 Calculus II or higher MAT 2680 Differential Equations 5 In addition to the above, students must complete 12 credits from one of the three concentrations below. Students can substitute a course from a different concentration with the permission of a faculty advisor.Industrial Design ConcentrationMECH 3520 Rapid Prototyping MECH 3550 Simulation and Visualization MECH 3610 Product Design I MECH 4710 Product Design II MECH 4800 Advanced 3-Dimensional Animation Manufacturing Systems ConcentrationMECH 3530 Advanced Engineering Materials MECH 3540 Manufacturing Systems MECH 3620 Advanced Manufacturing Processes MECH 4720 Plastics Product Manufacturing MECH 4820 Computer-Integrated Manufacturing Robotics ConcentrationMECH 3572 Embedded Systems and Applications in  Robotics MECH 3672 Actuators and Sensors Application in RoboticsMECH 4772 Control Systems in Robotics MECH 4872 Robotic Systems Design and Applications **TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES** **TOTAL NYSED LIBERAL ARTS AND SCIENCE CREDITS** **TOTAL CREDITS REQUIRED FOR THE DEGREE**  | 334456-8454\*4334Met as GenEdMet as GenEdMet as GenEdMet as GenEdMet as GenEd34-5333333332Met as GenEd333333333333333**77****44-46****121-123** |
| \* Courses that may have been required for associate degree1 Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements in that category.2 Students without the requisite math background must take MAT 1175, and/or MAT 1275 in preparation, depending on initial placement. This will increase the number of required credits for the degree by 4-8.3 Complete lists of liberal arts and sciences courses and advanced liberal arts courses, as well as semester-specific lists of interdisciplinary courses and writing intensive courses, are available online at the City Tech Pathways website.4 Students entering with an AAS in Industrial Design Technology should work closely with a department advisor. They must also complete MAT 1475, PHYS 1434 or 1422, and MECH 2333. They are not required to take MECH 4860 Project Management.5 MAT 2680 satisfies the requirement for an advanced liberal arts class in the College Option |  | \* Courses that may have been required for associate degree1 Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements in that category.2 Students without the requisite math background must take MAT 1175, and/or MAT 1275 in preparation, depending on initial placement. This will increase the number of required credits for the degree by 4-8.3 Complete lists of liberal arts and sciences courses and advanced liberal arts courses, as well as semester-specific lists of interdisciplinary courses and writing intensive courses, are available online at the City Tech Pathways website.4 Students entering with an AAS in Industrial Design Technology should work closely with a department advisor. They must also complete MAT 1475, PHYS 1434 or 1422, and MECH 2333. They are not required to take MECH 4860 Project Management.5 MAT 2680 satisfies the requirement for an advanced liberal arts class in the College Option |  |

Rational: Replacing MECH 3500 with MECH 3501 is an important step towards continuous curriculum improvement after the department was accredited by ABET in Fall 2014. Currently, MECH3500 covers topics in computer programming (MATLAB) and quality control. Topics in computer programming (MATLAB) are covered in MECH1240 Computer Applications in Mechanical Engineering Tech. MECH 3501 will focus on quality control applied to Mechanical Engineering Technology.

Library Resources & Information Literacy Form**: Major Curriculum Modification**

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new acquisitions; it will not affect curriculum proposals either positively or negatively.

Consult with library faculty subject selectors (<http://cityte.ch/dir>) **3 weeks in advance** when planning course proposals to ensure enough time to allocate budgets if materials need to be purchased.

**Course proposer:** please complete boxes 1-4. **Library faculty subject selector:** please complete box 5.

|  |  |  |
| --- | --- | --- |
| **1** | **Title of proposal**MECH 3501 Quality Control | **Department/Program**Mechanical Engineering Technology (MET) / BTech in Mechanical Engineering Technology  |
|  | **Proposed by** (include email & phone)Prof. Angran Xiaoaxiao@citytech.cuny.edu / 718-260-5239 | **Expected date course(s) will be offered** Fall 2018**# of students 18**  |

|  |  |
| --- | --- |
| **2** | **Are City Tech library resources sufficient for course assignments? Please elaborate.**A search of the CityTech/CUNY library catalog with the keyword “Quality Control” shows more than 50K results. Hence there are sufficient electronic resources which can be used as reference materials for this course. |

|  |  |
| --- | --- |
| **3** | **Are additional resources needed for course assignments? Please provide details about format of resources (e.g., ebooks , journals, DVDs, etc.), author, title, publisher, edition, and price.**No additional resources are needed for course assignments since sufficient number of papers, articles, journals on this subject are available in the library. |

|  |  |
| --- | --- |
| **4** | **Library faculty focus on strengthening students' information literacy skills in finding, evaluating, and ethically using information. We can collaborate on developing assignments and offer customized information literacy instruction and research guides for your course. Do you plan to consult with the library faculty subject specialist for your area? Please elaborate.**Once the course is offered, the department faculty teaching the course may consult with the library faculty subject specialist to determine the future needs of textbook change or update, and acquisition of additional book, journals and online resources.  |

|  |  |
| --- | --- |
| **5** | **Library Faculty Subject Specialist** \_\_\_Junior Tidal (Email: jtidal@citytech.cuny.edu) \_\_\_**Comments and Recommendations***Date:Aug. 28, 2017*After surveying the collection, I would highly recommend that the library acquire additional resources to support this course. Although there are a number of materials relating to quality control in the library catalog, a majority of these are electronic resources. Looking at the library’s physical collection, there appears to be only 1 book on quality control. I suggest adding more monographs related to quality assurance that have been published within the last 10 years to supplement the current collection. |

**Course Need Assessment**

This proposed course will be offered to the BTech MECH students in the Department of Mechanical Engineering Technology. It is expected that a section of 18 students will take this course every time when it is offered. The course will be offered in both Spring and Fall semesters every academic year.

Quality control is a process of reviewing the quality of all factors involved in production. It covers testing of products to uncover defects and improving/stabilizing production to avoid possible defects. Any industry, more or less, practices quality control in order to deliver products that meet or exceed customers’ expectations. Meanwhile, almost every school of engineering in this country has Quality Control class/classes in its undergraduate curricula. Most ABET accredited Mechanical Engineering Technology (BTech) programs also offer similar classes, such as Pennsylvania State University – Harrisburg, Purdue University, University of Houston, to name a few. Furthermore, employment opportunities exist in many industries for quality control engineers, from manufacturing to biochemical and software development. According to the Bureau of Labor Statistics, positions for quality control engineers are expected to receive strong pay (around $81,000 annually for industrial engineers), but must have a bachelor’s degree for even entry level positions ([www.learningpath.org](http://www.learningpath.org)). Therefore, offering a quality control class in our BTech program becomes necessary.

Our students and industry advisers has frequently expressed the needs for quality control classes. More and more graduates from our BTech MECH program started taking the entry level licensure exam, Fundamental of Engineering Exam (FE exam), right after their graduation. In the FE exam (other disciplines), about 8%~9% of questions are related to statistical quality control. It is essential for our students to understand the philosophy and mathematics concepts related to the management of quality assurance systems and quality improvement programs, and master the techniques currently used in the industry.

This course provides students with fundamental knowledge and techniques in quality control. It will help the students be better prepared for the competition in job market and the technical challenge they may encounter in their career. It directly supports one of the program educational objectives of the BTech MECH program, which states that graduates will “be employed as engineering technologist or designer, or to be enrolled in graduate programs in mechanical engineering technology or other related engineering technology fields”.

This course has no overlap with any other courses offered by the Department. According to the course descriptions in the current College Catalog, this course does not overlap with any course offered by any other departments.

**Course Design**

This course will be a required course in BTech MECH program curriculum. It is structured as a combination of lecture sessions and hands-on lab sessions. The hands-on sessions include lab exercises, experiments and group projects.

This course is not designed to be offered online.

No additional physical resources will be required since students will take this course in lieu of existing courses in the BTech MECH program. Adequate equipment and resources in the MET Department are available for the hands-on parts (lab experiments and course project) of the course. At least 8 existing MET faculty are qualified to teach this course.

Sample Course Outline

**COURSE SYLLABUS**

**New York City College of Technology**

**DEPARTMENT OF Mechanical ENGINEERING TECHNOLOGY**

**MECH 3501 Quality Control**

Instructor: Angran Xiao

Office: V534

Telephone: ext. 5239, Email: axiao@citytech.cuny.edu

Office Hours: As published on blackboard

1. **Catalog Description and Credit Hours of Course:**

This course presents the fundamental coverage of product quality control. Focused on data acquisition and analysis using quantitative techniques related to the management of quality assurance systems and quality improvement programs. Topics include process capability, control charts, acceptance sampling, quality engineering and quality design.

3 course credits, 2 classroom hours, and 2 Lab hours

1. **Prerequisites:**

MAT 1475, MECH 1240, MECH 2333

1. **Textbook**

Dale H. Besterfield, **Quality Control, 8th Ed.,** Prentice Hall, 2009, ISBN-10: 0135000955

Lecture Notes (distributed as handouts or available in library)

1. **Instructional Objectives and Assessment**

**Gen-Ed Objectives**

* Demonstrate mastery of discipline-specific knowledge, skills and tools.

Evaluation Methods and Criteria:

Students will demonstrate knowledge of basic technical terms, philosophy, and mathematical equations related to Total Quality Management. This will be demonstrated by quizzes, homework, midterm and final project presentation.

* Gather, interpret, evaluate and integrate information from a variety of sources.

Evaluation Methods and Criteria:

Student will work on project, which requires them to collect information directly from researched system, use the information effectively for quality control purpose, and present information in a clear and meaningful way. This will be demonstrated by project reports and final project presentation.

* Write, read, listen and speak clearly and effectively.

Evaluation Methods and Criteria:

Student will work on project and conduct experiments in the labs, they will collect data and present the findings. They should present their work in writing and oral presentations, which should be organized so that other can follow easily, with no lapses in logic or clarity. Students will submit project reports and lab reports.

* Function as an effective team member.

Evaluation Methods and Criteria:

Students will work in groups in the projects. They need to help the team move forward, made contribution to the project, complete all assigned tasks on time and address conflict effectively. The teamwork rubric in ABET student learning outcome assessment can be used.

**Course Specific Objectives**

All course specific objectives will be analyzed based on student performance on multiple choice questions, True/False questions short answer questions and calculation on quizzes, midterm, and final. The lab reports and final project reports will be essential too.

* Understand quality, quality control, and total quality management. Know the quality functions served by the computer.

Evaluation Methods and Criteria:

Students will exhibit knowledge in quality, quality control and TQM.

* Know the basic concepts and benefits of TQM. Know the continuous process improvement and the problem-solving method. Know the importance of supplier partnership and techniques to measure effectiveness. Understand basic TQM tools and techniques.

Evaluation Methods and Criteria:

Students will exhibit knowledge in TQM, understand the necessary management activities to implement a TQM program. Be able to describe the measures of performance and ISO 9000. Be able to use TQM tools and techniques.

* Understand the concept of the control chart. Know how to select the quality characteristics, the rational subgroup, and the method of taking samples. Understand process capability, different types of control charts and the reasons for their use.

Evaluation Methods and Criteria:

Students will be able to calculate the central value, control limits, and the revised control limits for X bar and R chart. Identify when a process in control/out of control. Students will complete a project related to control charts.

* Know the limitations of control charts and the different types of attribute charts.

Evaluation Methods and Criteria:

Students will be able to construct p-chart, c-chart and know the difference between them.

* Know the advantages and disadvantages of sampling; the types of sampling plans and selection factors; criteria for formation of lots; criteria for sample selection; and decisions concerning rejected lots. Understand ANSI/ASQ Z1.4.

Evaluation Methods and Criteria:

Students will be able to construct OC curve for single and double sampling plan. Determine the AOQ curve and the AOQL for a single sampling plan. Determine the sampling plan using ANSI/ASQ. Student will complete a project in sampling.

* Know the definition of reliability and the factors associated with it. Know the various techniques to obtain reliability. Understand the different types of test design.

Evaluation Methods and Criteria:

Students will be able to calculate the failure rate under different conditions. Calculate the OC curve. Determine life and reliability test plans.

1. **General Course Outline:**

|  |  |
| --- | --- |
| **Week** | **Weekly Topic** |
| 1 | Quality Definition, Responsibility for Quality, Quality Control, Total Quality Management History and PrinciplesLab 1: Dimensions of quality lab |
| 2, 3 | Total Quality Management Principles and Techniques. ISO9000. Process Control, Management and Planning Tools, Expected Value in Decision Making Lab 2: ISO 9000 lab |
| 4 | Tolerances in Design, Manufacturing, and Testing. Design for Desired Quality.Lab 3: Tolerances in machining lab |
| 5, 6 | Importance of Control Charts and their use. State of Control, Specifications, Process Capability, Other Control ChartsLab 4: Use of control charts in quality control and manufacturing processes improvement.  |
| 7 | Simulation of Defect Rates in Machining. Reliability of Machining System Lab 5: Defect rates in machining lab |
| 8 | Midterm  |
| 9, 10 | Control Charts for Attributes, Control Charts For Nonconforming Units/Count of Nonconformities, Quality Rating SystemLab 6: Control chart for attribute lab |
| 11 | ANSI/ASQ Z1.4 and its Application in Manufacturing Final Project: Quality Control in an Injection Molding ProcessThe team-based project provides students a hand-on opportunity to practice quality control principles under conditions that closely resemble current industry practice. It requires students to design a quality system for the injection molding process, create flow chart of the manufacturing process, construct control chart to monitor product quality, draw cause and effect diagram on things that impact product quality, propose and verify continuous improvement suggestions to reduce defects.  |
| 12, 13, 14 | Final Project: as above |
| 15 | Final Exam and Final Presentation |

1. **Student Evaluation**

Class and group participation starts day one and continues throughout the semester. This course is more meaningful if you ASK QUESTIONS. Grading will consist of the following criteria.

Assignments 15%

Team work 15%

Midterm Exam 15%

Final Exam 15%

 Lab Reports 15%

 Final Report and presentation 25%

1. **Student behavior/Classroom decorum**
* Students are suggested to access the class webpage on blackboard for new materials every school day during the semester.
* Coming in 5 minutes or later after the beginning of the class is considered as being late.
* No late assignment will be accepted and no makeup quiz/test will be offered without a justified and documented excuse (such as doctor’s note).
* Free discussion, inquiry, and expression are encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples may include
	+ - routinely entering class late or departing early;
		- use of cell phone or other electronic devices except otherwise approved by the instructor;
		- repeatedly talking in class without being recognized;
		- arguing in a way that is crossing the civility line;
1. **Disabilities Statement**

If you have special needs addressed by the Americans with Disabilities Act (ADA) and need course materials in an alternative format, please notify me immediately. Reasonable efforts will be made to accommodate your special needs.

1. **Academic Dishonesty**

Students are expected **to do their own work** on all graded course assignments including quizzes, tests, etc., except when otherwise assigned by the instructor. Academic dishonesty is prohibited in The City University of New York. Penalties for academic dishonesty include academic sanctions, such as failing or otherwise reduced grades, and/or disciplinary sanctions, including suspension or expulsion. Please see CUNY Policy on Academic Integrity here

https://openlab.citytech.cuny.edu/academicintegrity/files/2016/10/academic\_integrity\_policy.pdf**APPENDIX I**

**Department Meeting Minutes Showing Approval of the Proposal**

**Minutes of the Nov. 16, 2016 Department Meeting**

**Present Were:**

Chairman: S. Berri

Professors: M. Brahimi, S. Grod, M. Nakamura, Y. Ozlem, A. Rahman, N. Vaisman,

A. Xiao, A. Zhang

CLT: L. Cuevas

* Meeting started at 1:00 PM. Dr. Berri handed out agenda.
* Oct. 19, 2016 meeting minutes approved with minor change.
* Student Project. Dr. Berri reviewed a recent incident that a student wants to keep the project for herself. After consulting the special counsel to the president, it is clear that student projects belong to the department, for the benefits of future students and continues improvements.
* Dr. Berri reminded faculty to order materials for class projects through Mr. Cuevas. Anything related to computer should be ordered through Tech Fee.
* Dr. Berri informed faculty that all sections of the major classes are now full. He is opening new sections. Faculty discussed and decided not offering any class during winter session. The winter session is too short, and too intense for our students to actually understand the class material. This will affect their learning in more advanced classes.
* Adjunct coordination. Dr. Berri reviewed recent student complains about a class taught by an adjunct professor. He reminded course coordinators to maintain frequent contacts with adjunct professors teaching their classes. Coordinators should listen to student complains and guide adjunct professors in their teaching.
* Curriculum Modification. Faculties discussed curriculum changes proposed by the curriculum committee. They agreed to

change

MECH 4850, prerequisites MECH 4700 and MECH 4730

to

MECH 4850, pre or co-requisites MECH 4700 and MECH 4730

change

MECH 3500 Computer Programming and Applications

to

MECH 3501 Quality Control

The meeting was adjourned at 1:50PM.

Minutes respectfully submitted by Angran Xiao

**Appendix II**

**Evidence of Contacting EET and CET Departments**





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**Evidence of Contacting CST Departments**

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**APPENDIX III**

**Minor Curriculum Modification Form of MECH 4860**

New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | **Change prerequisite of MECH 4860** |
| **Date** | **10/11/2017** |
| **Major or Minor** | **Minor** |
| **Proposer’s Name** | **Angran Xiao** |
| **Department** | **Mechanical Engineering Technology** |
| **Date of Departmental Meeting in which proposal was approved** | **9/13/2017** |
| **Department Chair Name** | **Sidi Berri** |
| **Department Chair Signature and Date** |   10/2/17 |
| **Academic Dean Name** | **Kevin Hom** |
| **Academic Dean Signature and Date** |  |
| **Brief Description of Proposal**(Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | **Change the pre-requisite of** **MECH 4860 Project Management****from****Prerequisite: MECH 3500****To****Prerequisite: MECH 2333** |
| **Brief Rationale for Proposal**(Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).  | **MECH 3500 will be replaced by a new course MECH 3501. MECH 4860 does not rely on the new materials in MECH 3501. Instead, students learn some teamworking and management skills in MECH 2333, and MECH 4860 is built upon these skills.**  |
| **Proposal History**(Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | **10/11/17 first submission****12/12/17 changed Pre-req from MECH 2410 to MECH 2333 considering that AAS IND students are not required to take MECH 2410.** |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**ALL PROPOSAL CHECK LIST**

|  |  |
| --- | --- |
| Completed CURRICULUM MODIFICATION FORM including: |  |
| * Brief description of proposal
 | Y |
| * Rationale for proposal
 | Y |
| * Date of department meeting approving the modification
 | Y |
| * Chair’s Signature
 | Y |
| * Dean’s Signature
 | Y |
| Evidence of consultation with affected departmentsList of the programs that use this course as required or elective, and courses that use this as a prerequisite. | Y |
| Documentation of Advisory Commission views (if applicable). | N/A |
| Completed [Chancellor’s Report Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Chancellor_Report_Quick_Reference_Guide1.doc). | Y |

**EXISTING PROGRAM MODIFICATION PROPOSALS**

|  |  |
| --- | --- |
| Documentation indicating core curriculum requirements have been met for new programs/options or program changes.  | N/A |
| Detailed rationale for each modification (this includes minor modifications) | Y |

**List of Courses that use this course as prerequisite.**

**None**

**Section AV: Changes in Existing Courses**

**Changes to be offered in the Mechanical Engineering Technology department**

**MECH 4860 Project Management**

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 121625 |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** |  | **Department(s)** |  |
| **Course** |  | **Course** |  |
| **Prerequisite** | ~~MECH 3500~~ | **Prerequisite**  | MECH 2333 |
| **Corequisite** |  | **Corequisite** |  |
| **Pre- or corequisite** |  | **Pre- or corequisite** |  |
| **Hours** |  | **Hours** |  |
| **Credits** |  | **Credits** |  |
| **Description** |  | **Description** |  |
| **Requirement Designation** |  | **Requirement Designation** |  |
| **Liberal Arts** | [ ] Yes [ ] No  | **Liberal Arts** | [ ] Yes [ ] No  |
| **Course Attribute (e.g. Writing Intensive, Honors, etc** |  | **Course Attribute (e.g. Writing Intensive, Honors, etc** |  |
| **Course Applicability** |

|  |
| --- |
| [ ] Major |
| [ ] Gen Ed Required |
| [ ] English Composition |
| [ ] Mathematics |
| [ ] Science |
| [ ] Gen Ed - Flexible |
| [ ] World Cultures |
| [ ] US Experience in its Diversity |
| [ ] Creative Expression |
| [ ] Individual and Society |
| [ ] Scientific World |
| [ ] Gen Ed - College Option |
| [ ] Speech |
| [ ] Interdisciplinary  |
| [ ] Advanced Liberal Arts |

 | **Course Applicability** |

|  |
| --- |
| [ ] Major |
| [ ] Gen Ed Required |
| [ ] English Composition |
| [ ] Mathematics |
| [ ] Science |
| [ ] Gen Ed – Flexible |
| [ ] World Cultures |
| [ ] US Experience in its Diversity |
| [ ] Creative Expression |
| [ ] Individual and Society |
| [ ] Scientific World |
| [ ] Gen Ed - College Option |
| [ ] Speech |
| [ ] Interdisciplinary  |
| [ ] Advanced Liberal Arts |

 |
| **Effective Term** | Fall, 2018 |  |  |

**Rational**: MECH 3500 will be replaced by a new course MECH 3501. MECH 4860 does not rely on the new materials in MECH 3501. Instead, students learn some teamworking and management skills in MECH 2333, and MECH 4860 is built upon these skills. **Appendix IV**

**Syllabus of MECH 3500 Computer Programming and Applications**

**MECH 3500 Computer Programming and Applications**

|  |
| --- |
| **Course Description:** This course is an introduction to applications and theory of numerical methods. Roots and optimization, linear systems, curve fitting, integration and differentiation and differential equations. This course also involves programming using MATLAB.**Prerequisites:** MECH1240, MAT14753 course credits, 2-classroom hours, and 2 Lab hours**Required Text:**  Edward B. Magrab, **An Engineers Guide to MATLAB**, With Applications from Mechanical, Aerospace, Electrical, Civil, andBiological Systems Engineering, **3rd Edition, Prentice Hall** ISBN-13: 978-0131991101  ISBN-10: 0131991108 . **INSTRUCTIONAL OBJECTIVES** AND **ASSESSMENT****Evaluation Methods and Criteria:**  Students will exhibit skills in class, labs, and all homework assignments, laboratory exercises, quizzes and exams. **For the successful completion of this course, the students should be able to:** 1. Understand the mathematical models on the basis of scientific principles. Evaluation:Students will demonstrate skills in formulating mathematical models that express the essential features of a physical system or process in mathematical terms.  2. Understand how MATLAB’s calculator mode is used to implement interactive computations.Evaluation:Students will show skills in how real and complex numbers are assigned to variables, how vectors and matrices are assigned values using simple assignment. 3. Apply methods for finding the root of a single nonlinear equation, determine the roots graphically, and use the bisection method. Use the open methods and optimization. Evaluation:Students will use MATLAB to find roots in engineering problems, use graphical methods to estimate the roots of an equation. Write MATLAB programs using the Bracketing and the open methods. 4. Understand linear algebraic equations and matrices, solving small number of equations, matrix inverse, iterative methods.Evaluation:Students will demonstrate skills in performing matrix multiplication, representing a system of linear algebraic equations in matrix form, determine the matrix inverse, solve a system of nonlinear equations with successive substitution.5. Understand linear regression, linear and non-linear least regression, polynomial interpolation, splines interpolation.Evaluation:Students will illustrate skills in using least squares regression to fit a straight line to measured data, use MATLAB to solve normal equations in least squares, interpolate in MATLAB using polifit and polyval functions, fit a spline to data with MATLAB’s built-in functions.6. Understand numerical integration formulas, numerical integration of functions and numerical differentiation.Evaluation:Student will develop skills to implement trapezoidal rule, use MATLAB’s built-in functions quad and quad1 to integrate functions, evaluate derivative in MATLAB with the diff and gradient functions.7. Understand initial value problems in differential equations, adaptive methods and stiff systems, boundary-value problems.Evaluation:Students will demonstrate ability to solving initial-value problems for ordinary differential equations.**GRADING PROCEDURES:** 10% In-class participation, such as asking and answering questions. 25% Laboratory projects. 15% Homework assignments, 20 - 25% Midterm exam. 25 – 30 % Final exam **Course Outlines:** **Week 1****Lecture: Mathematical Model, Numerical methods, and problem solving.** Introduction: Learn how mathematical models can be formulated, understand how numerical methods afford a mean to generate solutions.**Laboratory work**: Practice Using MATLAB, case study. **Week 2 and 3****Lecture: MATLAB, Fundamentals.**Learn how real and complex numbers are assigned to variables, learn how vectors and matrices are assigned values, understanding the priority rules for constructing mathematical expression, learn how to use vectors to create a simple line plot based on an equation. Learn how to create an M-File, understanding the role of sub-functions and how they are accessed. **Laboratory work:** Practice Using MATLAB, case study.  **Week 4 and 5** **Lecture**: **Vectors, Matrices, and Data Inputs/Output**  Definitions of Matrices and Vectors, Creation of Vectors, Creation of Matrices, Dot Operations, Mathematical Operations with Matrices, Addition and Subtraction, Multiplication, Determinants, Matrix Inverse, Solution of a System of Equations; Strings and Annotated Output, Creating Strings, Converting Numerical Values to Strings andDisplaying Them, Entering Data with input, Entering a Scalar with input, Entering a String with input, Entering a Vector with input,Entering a Matrix with input, Input/Output Data Files, Cell Arrays, Input Microsoft Excel Files.**Laboratory work:** Practice Using MATLAB, case study.**Week 6 and 7****Lecture : Program Flow Control , Function Creation, and Selected MATLAB Functions**Introduction—The Logical Operator, Control of Program Flow, Branching—If Statement, Branching—Switch Statement, For Loop, While Loop, Early Termination of Either a for or a while Loop;User-Defined Functions, Function Handles, and feval, MATLAB Functions that Operate on Arrays of Data, Fitting Data with Polynomials—polyfit/polyval, Fitting Data with spline, Interpolation of Data—interp1, Numerical Integration—trapz, Area of a Polygon—polyarea, Digital Signal Processing—fft and ifft, MATLAB Functions that Require User-Defined Functions, Zeros of Functions—fzero and roots/poly, Numerical Integration—quadl and dblquad, Numerical Solutions of Ordinary Differential Equations—ode45,Numerical Solutions of Ordinary Differential, Equations—bvp4c, Numerical Solutions of Delay DifferentialEquations—dde23, Local Minimum of a Function—fminbnd,Symbolic Solutions and Converting Symbolic Expressions into Functions**Laboratory work:** Practice Using MATLAB, case study.**Week 8 Mid Term****Week 9 and 10****Lecture: 2D Graphics and 3D Graphics**Introduction, Graphics Management, Basic 2D Plotting Commands, Changing a Graph’s Overall Appearance, Special Purpose Graphs, Reading, Displaying, and Manipulating Digital Images, Graph Annotation and Enhancement, Axes and Curve Labels, Figure Titles, Legends, and Text Placement, Filling Regions, Greek Letters, Mathematical Symbols, Subscripts, and Superscripts, Altering the Attributes of Axes, Curves, Text, and Legends, Positioning One Figure Inside Another Figure, Interactive Plotting Tools, Animation, Lines in 3D, and Surfaces.**Laboratory work:** Practice Using MATLAB, case study.**Week 11 and 12****Lecture: Engineering Statistics**Descriptive Statistical Quantities, Probability Distributions, Discrete Distributions, Continuous Distributions, Confidence Intervals, Hypothesis Testing, Linear Regression, Simple Linear Regression, Multiple Linear Regression,Design of Experiments, Single-Factor Experiments, Analysis of Variance, Multiple-Factor Factorial Experiments**Laboratory work:** Practice Using MATLAB, case study.**Week 13 and 14****Lecture: Special Topics in Dynamics and Vibration, Fluid Mechanics and Optimization** Single-Degree-of-Freedom Vibratory Systems, Free Oscillations, Forced Oscillations, Nonlinear Systems: Free Oscillations and Forced Oscillations; Hydrostatics: Pressure Distribution in the Standard Atmosphere, Force on a Planar Gate, Internal Viscous Flow, Laminar Flow in a Horizontal Pipe with Circular Cross Section, Downward Turbulent Flow in a Vertical Pipe Definition, Formulation, and Graphical Solution, Introduction to optimization, Graphical Solution, Linear Programming, Binary Integer Programming, Nonlinear Programming: Unconstrained and Curve Fitting, Unconstrained Optimization, Curve Fitting: One Independent Variable, Several Independent Variables, Constrained Single Objective, Constrained Single-Variable Method, Constrained Multivariable Method, Quadratic Programming.**Laboratory work:** Practice Using MATLAB, case study.**Week 15 Final Exam** |

**APPENDIX V**

**Syllabus of MECH 1240 Computer Applications in Mechanical Engineering Technology**

**Department of Mechanical Engineering Technology**

**MECH1240 – Computer Applications in Mechanical Engineering Technology**

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| **Course Description:** Computer applications in mechanical engineering technology that give the student a working knowledge in using the computer as a tool. The student will develop programming skills in a modern high level programming language and apply these skills in performing engineering and technical calculations, data entry and data retrieval. The computer will also be applied as a design tool. The student is introduced to computer graphics and to using the computer as a machine controller. **Pre/ Corequisites:** MAT 1275**Required Text:** **Introduction to Matlab for Engineers** William J. Palm III, McGraw Hill AISN: B006Z0QS5U**References:**  **Matlab for Engineers** Holly Moore ISBN-10: 0136044220 **Course Objective/Learning Outcomes**The objective of this course is to prepare students with solid engineering knowledge, problem solving ability, and hands-on skills in using computational software to solve engineering and mathematical problems. A secondary objective is to provide students with tools to create smart 2D and 3D plots and get a solid back ground in computer programming. **Relationships to Program Outcomes**For the successful completion of this course, each student should demonstrate:* Strong skills in using Matlab and full understanding of the functions and the ability to create user defined functions.
* The ability to conduct, analyze, and interpret any data from experiments and apply experimental results to improve processes.
* Understand the use of logical operators, logical functions, and control structures in Matlab
* The ability to utilize computational software to solve engineering problems in a rigorous mathematical environment that is above the level of algebra or trigonometry.

 **GRADING PROCEDURES:** 10% In-class participation, such as asking and answering questions. 15% Quizzes and projects 15% Homework assignments, 30% Midterm exam, and 30% Final exam **Weekly Schedule:** **Week 1****Introduction to the computer. Introduction to Matlab version 6.**Familiarity with a computer. Recognize the major parts of the computer. Understand the difference between Matlab and any other programming languages. In addition to a review for Algebra. **Week 2****Getting started using Matlab.** Launch Matlab. Manage the screen. Use screen commands such as help, who, clc, %, etc… Computing with Matlab, work with numbers, variables, special variables, etc…**Week 3 & 4****Programming using Matlab. Script files and the editor/debugger.** Write simple programs using Matlab. Create and use a script file. Debugging script files. Creating user defined functions.**Week 5 & 6****Plotting using Matlab.** Plotting in 2D and 3D, subplots, overlay plots, different plot commands, and the plot editor**Week 7** **Midterm Examination****Week 8 & 9****Array and matrix operations. Array editor**Create and execute operations on vectors and matrices in Matlab. Use of functions such as Magnitude, length, and absolute value of a vector. **Week 10****Trigonometric, exponential, and special math functions.** Write and run simple programs using trigonometric, exponential, special math functions and curve fitting for polynomials.**Week 11 & 12****Symbolic Matlab and Interpolation functions**Work with polynomials and symbolic expressions. Solve equations with one or two unknowns using matrix methods for linear equations. **Week 13 & 14****Matlab Structures and Loops.** looping using for and while, conditional statements. Understanding, writing and running simple programs using Matlab structures. **Week 15** **Final Exam**Update by Dr. Gailani, fall 2010 |