Wilkes University Curriculum Committee

PROPOSAL SUBMITTAL FORM

Directions:
- Use this set of forms for all proposals sent to the Curriculum Committee.
- Pages 1-3 of this document are required. Any unnecessary forms should be deleted from the packet before submissions. If multiple forms are needed (course addition, course deletion, etc), simply copy and paste additional forms into this packet.
- Note that all new programs (majors and minors), program eliminations, significant program revisions and all general education core revisions must be reviewed and approved by the Provost and Academic Planning Committee (APC) prior to submission to the Curriculum Committee. The Provost will make the decision if a program revision requires APC review.
- Completed and signed forms are due no later than the second Tuesday of every month. Submit one signed original hard copy and a scanned electronic copy with all signatures to the Chair of the Curriculum Committee.

1. Originators: Name
   Prahlad Murthy
   Holly Frederick
   Marleen Troy
   Brian Whitman, Chairperson

   Department
   Environmental Engineering & Earth Sciences

   Phone and email
   (570) 408-4882; brian.whitman@wilkes.edu

2. Proposal Title: B.S. in Environmental Engineering (ENV) Program Revision

3. Check only one type of proposal: (double click on the appropriate check box and change default value to "checked").

   □ New Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC.
   □ Elimination of Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC.
   X Program Revision. Significant revisions to a program require review and approval by the Provost. The Provost determines if review and approval by APC is necessary.
   □ General Education Revision. Submissions only accepted from the General Education Committee (GEC). Must be reviewed and approved by the Provost.
   □ Creation of new departments, elimination of existing department. This requires prior review and approval by the Provost and APC.
   □ Course additions or deletions not affecting programs (such as elective courses, transition of "topics" courses to permanent courses).
   □ Change in course credit or classroom hours.
   □ Incidental Changes. Includes changes in course/program title, course descriptions, and course prerequisites. (Although these changes do require approval by the Curriculum Committee, they do not go before the full faculty for approval).
   □ Other (Specify)
4. Indicate the number of course modification forms that apply to this proposal:

   ___3___ Course Addition Form (plus syllabi)
   ___--___ Course Deletion Form
   ___--___ Course Change Form

5. Executive Summary of Proposal.

All ENV majors are required to take the Fundamentals of Engineering (FE) examination before they graduate; passing the FE exam to be certified an as Engineer-in-Training (EIT) is the first step toward becoming a registered Professional Engineer (P.E.) in the United States. In 2013, the board that “develops, administers, and scores” the FE examination, viz. the National Council of Examiners for Engineering and Surveying (NCEES) changed the subject content for environmental engineering by deleting questions relating to topics in electrical engineering on the exam. Hence, the proposal to drop the two electrical engineering courses, i.e., EE 211 and EE 283 from the ENV curriculum by changing them from “required for graduation” to “serve as technical electives” option.

The other important reason to propose changes to the curriculum relates to the Environmental Engineering Program Educational Objectives, which are mentioned below:

The BS in Environmental Engineering program will produce graduates:

- who are prepared for employment with technical knowledge for practice in traditional and broader areas of environmental engineering, which qualifies them to pursue professional licensure in service to government agencies, and industries.

- who actively pursue graduate studies leading to advanced degrees.

- who demonstrate an understanding of ethical and professional responsibilities that will assist them in their professional growth through life-long learning.

The addition of the three courses listed below will better prepare the ENV students to take the FE examination and also with their employment and graduate studies immediately following graduation:

i. ENV 201 Environmental Engineering Systems I: Chemical Kinetics & Statistical Methods
ii. ENV 202 Environmental Engineering Systems II: Analytical & Computational Analysis
iii. ENV 301 Environmental Engineering Systems III: Advanced Unit Operations and Processes

Results from the FE examination is one of the many tools that the ENV program uses in the assessment of Student Objectives, which are listed below:

Each graduate of the ENV program should be able to demonstrate:

a) an ability to apply knowledge of mathematics, science, and engineering

b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d) an ability to function on multidisciplinary teams

c) an ability to identify, formulate, and solve engineering problems

f) an understanding of professional and ethical responsibility

g) an ability to communicate effectively

h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i) a recognition of the need for, and an ability to engage in life-long learning

j) a knowledge of contemporary issues

k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The ENV program uses the FE Exam results as an assessment tool for the following student outcomes:

➢ **Student Outcome a:** an ability to apply knowledge of mathematics, science, and engineering.

➢ **Student Outcome b:** an ability to identify, formulate, and solve engineering problems.

➢ **Student Outcome f: an understanding of professional and ethical responsibility.**
   Uses FE exam results from the following subjects: Ethics and Business Practice.

The addition of the three proposed environmental engineering courses in place of two electrical engineering courses will strengthen the ENV program curriculum. It must be noted that the proposed changes will not alter the ENV program’s minimum credits required for graduation, which is 134.

6. Other specific information. (Not applicable for incidental changes.)

The proposed changes in the ENV program will not affect any other program’s requirements. The proposed courses will mostly be taught by the EEES Department faculty and hence, has the potential to affect its teaching loading. Similarly, since the electrical engineering courses are not required for graduation for ENV majors, this proposed change has the potential to reduce the teaching loading of the Electrical Engineering Department’s faculty.
7. Program Outline.

**Proposed Changes to the ENV Program Curriculum**

<table>
<thead>
<tr>
<th>FIRST SEMESTER</th>
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<th>SECOND SEMESTER</th>
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<td>FYF 101 First Year Foundations</td>
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<td>EES 211 Physical Geology</td>
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<td>ENV 205 Environmental Microbiology</td>
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<td>EES 240 Principles of Environmental Engineering &amp; Science</td>
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<td>ME 231 Statics</td>
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<td>MTH 232 Strength of Materials</td>
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<td>MTH 211 Introduction to Differential Equations</td>
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<td>EGR 201 Engineering Ethics</td>
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<td>ENV 330 Water Quality</td>
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<td>ME 323 Fluid Mechanics Lab</td>
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<td>ENV 305 Solid Waste Management</td>
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<td>ENV 322 Water Resources Engineering</td>
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<td>ENV 351 Water &amp; Wastewater Treatment</td>
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<td>ENV 352 Environmental Engineering Hydraulics</td>
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<td>ENV 353 Air Pollution Control</td>
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<td>ENV 354 Hazardous Waste Management</td>
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<td>ENV 391 Senior Projects I</td>
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*Free elective must be numbered 101 or higher

**Advisor approved science or engineering courses numbered 200 or above, with at least one course in engineering. Technical electives must include either EES 271 or EES 272.
8. Signatures and Recommendations. (please date)
   - Signatures of involved Department chair(s) and Dean(s) indicate agreement with the proposal and that adequate resources (library, faculty, technology) are available to support proposal.
   - If a potential signatory disagrees with a proposal he/she should write "I disagree with this proposal" and a signed statement should be attached to this submission.

Print Name/Title                      Signature                       Date
Brian E. Whitman, Environmental Engineering and Earth Sciences

Print Name/Title                      Signature                       Date
Thyagarajan Srinivasan, Electrical Engineering and Physics

Print Name/Title                      Signature                       Date
Terese Wignot, College of Science and Engineering

Print Name                           Signature                       Date
Susan Hritzak, Registrar

Print Name                           Signature                       Date
Anne Skleder, Provost (For new programs, significant revisions and revisions to the General Education Program revisions only).
   Provost should check here if this proposal is a program revision AND the significance of the revision requires review and approval by APC prior to Curriculum Committee.

Print Name                           Signature                       Date
Chair, Academic Planning Committee. For new programs, program revisions sent via the provost. Signature indicates that the proposal has been reviewed and approved by APC.
Wilkes University Curriculum Committee
COURSE ADDITION FORM

1. Course Title: Environmental Engineering Systems I: Chemical Kinetics & Statistical Methods

2. Course Number: ENV 201

3. Course Credit Hours: 1
   Classroom Hours: 1   Lab Hours: --   Other: 1

4. Course Prerequisites: CHM 113, CHM 115, or instructor’s permission

5. Course Description (as proposed for the Bulletin): Course descriptions provide an overview of the topics covered. If the course is offered on a scheduled basis, i.e. every other year, or only during a set semester, note this in the description. Course descriptions should be no more than two to three sentences in length.

   This course focuses on understanding the factors that control species behavior in environmental systems and provides the foundation for estimating pollutant concentrations and their fate in the environment. This course also provides an introduction of central ideas of probability and statistics and their application in the analysis of environmental data and information.

6. Required Documentation:
   Proposed Syllabus   Attach proposed syllabus immediately after this document. In some situations the official syllabus may contain information which is beyond the review needs of the Curriculum Committee (such as extensive rubrics, etc). It is permissible to attach an abbreviated syllabus. In general, syllabi (whether full or abbreviated) should contain the following information: Course Title, Course Number, Credit hours, Faculty Information (name contact information, office hours), Course Description, Course Outcomes or Objectives, Assessment (grading) information, required texts (or other things such as tools, software, etc.), pertinent policies and a proposed schedule of topics.

   See attachment
Wilkes University Curriculum Committee
COURSE ADDITION FORM

1. Course Title: Environmental Engineering Systems II: Analytical & Computational Analysis

2. Course Number: ENV 202

3. Course Credit Hours: 2
   Classroom Hours: --   Lab Hours: 2   Other: --

4. Course Prerequisites: MTH 111, MTH 112, or instructor’s permission

5. Course Description (as proposed for the Bulletin): Course descriptions provide an overview of the topics covered. If the course is offered on a scheduled basis, i.e. every other year, or only during a set semester, note this in the description. Course descriptions should be no more than two to three sentences in length.

   This course focuses on basic methods for obtaining numerical solutions of algebraic and transcendental equations, simultaneous linear equations, and curve fitting techniques; examples provided are relevant to environmental engineering processes; introduction to problem-solving using Excel, and MATLAB.

6. Required Documentation:
   Proposed Syllabus  Attach proposed syllabus immediately after this document. In some situations the official syllabus may contain information which is beyond the review needs of the Curriculum Committee (such as extensive rubrics, etc). It is permissible to attach an abbreviated syllabus. In general, syllabi (whether full or abbreviated) should contain the following information: Course Title, Course Number, Credit hours, Faculty Information (name contact information, office hours), Course Description, Course Outcomes or Objectives, Assessment (grading) information, required texts (or other things such as tools, software, etc.), pertinent policies and a proposed schedule of topics.

   See attachment
Wilkes University Curriculum Committee  
COURSE ADDITION FORM

1. Course Title: Environmental Engineering Systems III: Advanced Unit Operations & Processes

2. Course Number: ENV 301

3. Course Credit Hours: 1  
   Classroom Hours: 1  
   Lab Hours: --  
   Other: 1

4. Course Prerequisites: ENV 240; Corequisites: ENV 305, ENV 351 or instructor’s permission

5. Course Description (as proposed for the Bulletin): Course descriptions provide an overview of the topics covered. If the course is offered on a scheduled basis, i.e. every other year, or only during a set semester, note this in the description. Course descriptions should be no more than two to three sentences in length.

   Examination of unit operations and processes encountered in the environmental engineering field that will assist in the design and operation of advanced water, wastewater, and waste management treatment systems.

6. Required Documentation: 
   Proposed Syllabus Attach proposed syllabus immediately after this document. In some situations the official syllabus may contain information which is beyond the review needs of the Curriculum Committee (such as extensive rubrics, etc). It is permissible to attach an abbreviated syllabus. In general, syllabi (whether full or abbreviated) should contain the following information: Course Title, Course Number, Credit hours, Faculty Information (name contact information, office hours), Course Description, Course Outcomes or Objectives, Assessment (grading) information, required texts (or other things such as tools, software, etc.), pertinent policies and a proposed schedule of topics.

   See attachment
Environmental Engineering & Earth Sciences Department
ENV 201 Environmental Engineering Systems I: Chemical Kinetics & Statistical Methods

Course Description: This course focuses on understanding the factors that control species behavior in environmental systems and provides the foundation for estimating pollutant concentrations and their fate in the environment. This course also provides an introduction of central ideas of probability and statistics and their application in the analysis of environmental data and information.

1 Credit 1 hour lecture, 1 hour discussion per week.

Prerequisites CHM 113, CHM 115, or Instructor’s permission

Course Objectives:
1) To reinforce knowledge of basic (freshman) chemistry, probability, and statistics.
2) To gain basic understanding of the rates and kinetics of a range of chemical and biological systems of significance to environmental engineering.
3) To familiarize with basic techniques for managing environmental data and communicating statistical results.

Topics:
- Units, Measurement, Errors
- General chemistry
- Equilibrium chemistry
- Environmental reaction kinetics
- Statistical models & statistical analysis
- Probability distribution functions
- The Normal Distribution
- Sample estimates

III Course Outcomes and Assessment
The Accreditation Board for Engineering and Technology (ABET) Criteria 2000 define a number of program outcomes that all graduates of ABET accredited engineering programs must have. These outcomes are required of all BS in Environmental Engineering graduates, and are listed below:

“All graduates of the program must demonstrate that their graduates have:
  a. an ability to apply knowledge of mathematics, science and engineering appropriate to the discipline
  b1. an ability to design and conduct experiments
  b2. an ability to analyze and interpret data
  a. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
  d. an ability to function on multi-disciplinary teams
  e. an ability to identify, formulate, and solve engineering problems
  f. an understanding of professional and ethical responsibility
  g. an ability to communicate effectively
  h. the broad education necessary to understand the impact of engineering solutions in a global/societal context
  i. a recognition of the need for and an ability to engage in lifelong learning
  j. a knowledge of contemporary issues
  k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice”

ENV 201 is designed to address many, but not all of these outcomes. The specific course outcomes anticipated by successful completion of ENV 201 are listed below. This statement of course outcomes will give a broader perspective on the overall objectives of the course.

Outcome a: is central to the course. Solving open-ended problems with alternative solutions involve the application of knowledge of basic science, engineering and mathematics. We apply the calculus to study reaction kinetics and in performing material and energy balances.

Outcome b2: Designing of pollution abatement systems are mostly based on the concentration of pollutants in the influent stream and the regulated concentrations in the effluent stream. Problems involve statistical analysis of existing and/or collected data.
Outcomes h, i, & j: are frequently considered in the class discussions of articles in the current literature (e.g., AWMA's Research Journal, Water Environment Federation’s Research Journal, and Environmental Manager magazine among others) and during discussions of environmental impact of different pollution control strategies, (e.g., P2 vs. Treatment).

IV. Grading:
Test #1: 15%  Test #2: 15%  Test #3: 15%  Final Exam: 30%  Homework: 25%

V. Cumulative Scores:

<table>
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<tr>
<th>Score Range</th>
<th>Percentage</th>
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<tr>
<td>90+</td>
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<td>65-69.9</td>
<td>1.5</td>
</tr>
<tr>
<td>60-64.9</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Minimum score of 60/100 to pass the course. To receive a passing grade, every single assignment, quiz, test, and project must be completed and submitted.

Class Policies
Please refer to the 2014-15 edition of the Wilkes University Student Handbook for all school policies including those on intellectual responsibility, plagiarism, attendance, and campus attire. In addition, following policies apply to this course.

Attendance Policy
Students are required to attend all lecture, lab, and discussion classes and attendance record in the course will be considered in determining a student's grade. Tests and Quizzes missed will not be given under normal circumstances. It is the student's responsibility to complete all reading and other assignments. Students are encouraged to participate in meaningful discussions and to control the pace of the class.

Submission of Work
This class provides considerable opportunity for students to work together on problems, programs, etc. Copying of others work will not be tolerated. Material presented for grading should reflect each individual's work. Consult with one another but do not copy. Obvious copying will result in a zero or a negative score. Plagiarism is illegal, unethical, and will not be tolerated. Any evidence of this act will automatically result in no points for that exercise, at the least. If felt appropriate, a student may be further penalized.

Late submissions of assignments up to 48 hours after the deadline will be eligible for partial credit; submissions after the 48-hour-past-the-deadline period will receive a zero grade on that assignment but still needs to be submitted to be eligible to receive a grade in the course.

Please use engineering paper for homework, projects, and where appropriate. Do not chew gum in the class. Being to class on time is mandatory. Cell phones must be turned off while inside of the classroom. Use of applications on cell phone for calculations is not permitted - just use a scientific non-graphing calculator.

Please Note: If a student has a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, he/she should contact University College Disability Services for information on appropriate policies and procedures. Accommodations can only be made based upon the documented recommendations of University College. Disability Services is located on the third floor of Conyngham Hall, 408-4150.
Environmental Engineering & Earth Sciences Department
ENV 202 Environmental Engineering Systems II: Analytical & Computational Analysis

Course Description: This course focuses on basic methods for obtaining numerical solutions of algebraic and transcendental equations, simultaneous linear equations, and curve fitting techniques; examples provided are relevant to environmental engineering processes; introduction to problem-solving using Excel, and MATLAB.

2 Credits 2 hour lab per week.

Prerequisites MTH 112 or Instructor’s permission

Course Objectives:
1) To reinforce knowledge of mass and energy balance.
2) To gain basic knowledge in the application of numerical methods to determine solutions to steady and unsteady-state environmental processes the rates and kinetics of a range of chemical.
3) To introduce students to analyze and simulate environmental systems using MATLAB.

Topics:
- Mass & Energy Balance
- Simulation of Steady & Unsteady State Processes
- Solution of Algebraic & Transcendental Equations
- Interpolation
- Numerical Differentiation & Integration

III Course Outcomes and Assessment
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“All graduates of the program must demonstrate that their graduates have:

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d. an ability to function on multi-disciplinary teams
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g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global/societal context
i. a recognition of the need for and an ability to engage in lifelong learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice”

ENV 202 is designed to address many, but not all of these outcomes. The specific course outcomes anticipated by successful completion of ENV 202 are listed below. This statement of course outcomes will give a broader perspective on the overall objectives of the course.

Outcome a: is central to the course. Solving open-ended problems involve the application of knowledge of basic science, engineering and mathematics.

Outcome e: conducting material balance and indentifying process requirements are the basis for designing pollution abatement systems; problems involve determining reaction rates, detention times, and volumes for steady state and non-steady state systems to meet treatment goals.
Outcome k is addressed through design problems that involve iterative methods and the use of Excel and MATLAB in analyzing environmental systems.

IV. Grading:

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<td>Projects</td>
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Minimum score of 60/100 to pass the course. To be eligible to receive a passing grade, every single assignment, quiz, test, and project must be completed and submitted before the beginning of the term's final week of classes.

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Please Note: If a student has a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, he/she should contact University College Disability Services for information on appropriate policies and procedures. Accommodations can only be made based upon the documented recommendations of University College. Disability Services is located on the third floor of Conygham Hall, 408-4150.
Environmental Engineering & Earth Sciences Department

ENV 301 Environmental Engineering Systems III: Advanced Unit Operations & Processes

Course Description: Examination of unit operations and processes encountered in the environmental engineering field that will assist in the design and operation of advanced water, wastewater, and waste management treatment systems.

1 Credit 1 hour lecture, 1 hour discussion per week.

Prerequisites EES 240 Co-requisites ENV 305, ENV 351 or Instructor's permission

Course Objectives:
1) to review concepts of material balance as applicable to water and wastewater treatment.
2) to introduce the concepts of advanced water, wastewater, and waste treatment unit operations and processes.
3) to develop typical flow sheets for advanced treatment processes

Topics:
- Mass & Energy Balance
- Iron & Manganese Removal
- Nitrates and phosphorus removal
- Municipal solids waste management

III Course Outcomes and Assessment

The Accreditation Board for Engineering and Technology (ABET) Criteria 2000 define a number of program outcomes that all graduates of ABET accredited engineering programs must have. These outcomes are required of all BS in Environmental Engineering graduates, and are listed below:

“All graduates of the program must demonstrate that their graduates have:

a. an ability to apply knowledge of mathematics, science and engineering appropriate to the discipline
b. an ability to design and conduct experiments and to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multi-disciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global/societal context
i. a recognition of the need for and an ability to engage in lifelong learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice”

ENV 301 is designed to address many, but not all of these outcomes. The specific course outcomes anticipated by successful completion of ENV 301 are listed below. This statement of course outcomes will give a broader perspective on the overall objectives of the course.

Outcome a: is central to the course. Solving open-ended problems involve the application of knowledge of basic science, engineering and mathematics. We apply the calculus to perform material and energy balances.

Outcome c: the course involves in the preliminary design of systems to remove metals, and nutrients from water, wastewater, and other wastes involving a "holistic" approach that includes technical, ethical, environmental, and economical constraints.

Outcome e: is addressed through the design and analyses of treatment operations.
Outcomes h & j: are frequently considered in the class discussions of articles in the current literature (e.g., Water Environment Federation’s Research Journal, and Journal of Environmental Engineering among others).

IV. Grading:

Mid-term Exam: 20%  Final Exam: 30%  Homework: 20%  Design Projects: 30%

V. Cumulative Scores:

\[
\begin{array}{cccc}
90+ & : 4.0 & 85 - 89.9 & : 3.5 & 80 - 84.9 & : 3.0 & 75 - 74.9 & : 2.5 \\
70 - 74.9 & : 2.0 & 65 - 69.9 & : 1.5 & 60 - 64.9 & : 1.0
\end{array}
\]

Minimum score of 60/100 to pass the course. To receive a passing grade, every single assignment, quiz, test, and project must be completed and submitted.

Class Policies

Please refer to the 2014-15 edition of the Wilkes University Student Handbook for all school policies including those on intellectual responsibility, plagiarism, attendance, and campus attire. In addition, following policies apply to this course.

Attendance Policy
Students are required to attend all lecture, lab, and discussion classes and attendance record in the course will be considered in determining a student’s grade. Tests and Quizzes missed will not be given under normal circumstances. It is the student’s responsibility to complete all reading and other assignments. Students are encouraged to participate in meaningful discussions and to control the pace of the class.

Submission of Work
This class provides considerable opportunity for students to work together on problems, programs, etc. Copying of others work will not be tolerated. Material presented for grading should reflect each individual’s work. Consult with one another but do not copy. Obvious copying will result in a zero or a negative score. Plagiarism is illegal, unethical, and will not be tolerated. Any evidence of this act will automatically result in no points for that exercise, at the least. If felt appropriate, a student may be further penalized.

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