Instructor: Dr. Yeqin Huang

Contact Info: Office: Belk 337
Office Hours: Posted on office door
Office Phone: 227-2543
E-mail: yhuang@email.wcu.edu

Meeting Periods: MWF 9:05 – 9:55, Belk 355

Course Description: An introduction to electromagnetic fields. The subjects covered include Coulomb’s law, Gauss’ law, electrical potential, dielectric materials, capacitance, boundary value problems, Biot-Savart law, Ampere’s law, Lorentz force, magnetic materials, inductance, Faraday’s law, time-varying fields and Maxwell’s equations.

Course Goals: The objective of this course is to provide an understanding of electromagnetic fields, dielectric and magnetic materials, as well as an introduction to Maxwell’s equations. Upon completion of the course, the student will be able to accomplish the following:

1. Demonstrate an understanding of basic concepts of electric and magnetic fields.
2. Understand and apply mathematical concepts of vector analysis to the solution of electrostatic and magnetostatic engineering problems.
3. Solve engineering problems by applying higher level mathematics and making use of the Coulomb’s law, Gauss’ Law, Biot-Savart law, Ampere’s law and Faraday’s law.

Prerequisites: EE 202 Network Theory II with a grade of C or better.


References: Handouts, class notes, library holdings, and worldwide web.

Instructional Approach: Course material will be introduced during lecture. Homework assignments will reinforce material covered in class.

Evaluation: Each student will be evaluated based on performance in the following areas. Respective weights of each performance area are as noted.

- Homework 25%
- Two Tests 30%
- Quiz 15%
- Final exam 30%
The grading scale below will be used to determine final grades:

<table>
<thead>
<tr>
<th>Numerical Course Average</th>
<th>Grade Assigned</th>
<th>Numerical Course Average</th>
<th>Grade Assigned</th>
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<tbody>
<tr>
<td>97 - 100</td>
<td>A+</td>
<td>72 - 77</td>
<td>C</td>
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<tr>
<td>92 - 96</td>
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<td>70 - 71</td>
<td>C-</td>
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<tr>
<td>90 - 91</td>
<td>A-</td>
<td>68 - 69</td>
<td>D+</td>
</tr>
<tr>
<td>88 - 89</td>
<td>B+</td>
<td>62 - 67</td>
<td>D</td>
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<tr>
<td>82 - 87</td>
<td>B</td>
<td>60 - 61</td>
<td>D-</td>
</tr>
<tr>
<td>80 - 81</td>
<td>B-</td>
<td>0 - 59</td>
<td>F</td>
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<tr>
<td>78 - 79</td>
<td>C+</td>
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Attendance: Students are required to attend all lectures.

Examinations: Two one-hour exams and a final are anticipated. All exams are closed book and closed notes, unless otherwise stated by the instructor. Calculators are permitted on all exams.

Assignments: Timely and full completion of assignments is vital to student success in this course. To this end, the following policies will be in effect:

- Students are expected to submit work on time. Assignments submitted after the due date will not be accepted.
- No make-up exams will be given unless the instructor is notified prior to the absence and/or corroborating documentation of the reason for the absence is provided.
- Assignments missed due to an excused absence will be due during the next class period.

Honor Code: Students are expected to comply with the spirit and intent of the University Academic Honesty Policy as stated in the Undergraduate Catalogue. Visit WCU’s Undergraduate Student Handbook for all related policies and procedures. [http://www.wcu.edu/studentd/StudentHandbook](http://www.wcu.edu/studentd/StudentHandbook). Evidence of academic dishonesty will result in a grade of F (numerically “0”) for that assignment on the first infraction. A second infraction will result in a grade of F for the course.

Disabilities: Western Carolina University is committed to providing equal educational opportunities for students with documented disabilities. Students who require reasonable accommodations must identify themselves as having a disability and provide current diagnostic documentation to Disability Services. All information is confidential. Please contact Disability Services for more information at (828) 227-2716 or 144 Killian Annex. You can also visit the office’s website: [http://www.wcu.edu/12789.asp](http://www.wcu.edu/12789.asp).

Classroom Policies: The following policies will be in effect during class meetings:

- Cell phones must be turned off during class time.
- Drinks, food and tobacco are not permitted in classrooms or laboratories.
- Instant messenger, AOL or other non-instructional software is not permitted on classroom or lab computers. Printing of material in lab which is not course-related is also not permitted.

CoursesEval Dates: Nov. 12 – Dec. 8
Tentative Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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</thead>
</table>
| 01   | Vector analysis  
Orthogonal coordinate systems |
| 02   | Coulomb's law, Electric field intensity  
Electric field due to a continuous distribution of charges |
| 03   | Electric flux density  
Gauss's law and applications |
| 04   | Gauss's law and applications, cont’d  
Electric potential, Potential gradient |
| 05   | The potential field of a system of charges,  
Electrostatic energy |
| 06   | Conductors in static electric fields  
Dielectrics in static electric fields |
| 07   | Dielectrics in static electric fields, cont’d  
Continuity equation, Boundary conditions |
| 08   | Poisson’s and Laplace’s equations, Uniqueness theorem  
**TEST 1** |
| 09   | Resistance and capacitance  
Method of images |
| 10   | Biot-Savart’s law  
Lorentz force |
| 11   | Ampere’s law, Applications of Ampere’s law  
Magnetic flux density |
| 12   | Magnetic torque and moment  
Magnetic dipole |
| 13   | Inductance  
Magnetic energy, Magnetic materials |
| 14   | Faraday’s law  
Maxwell’s equations |
| 15   | Review  
**TEST 2** |