# EP 4ES3
## Special Topics in Engineering Physics -- Photonics, Microelectronics and Nuclear Technologies

*Seeing technology at work everywhere*

Fall 2017 M 8:30-11:30

Course Outline

### CALENDAR/COURSE DESCRIPTION

3 unit(s)
Various topics in Engineering Physics will be examined. This course is a self-study course.

### PRE-REQUISITES AND ANTI-REQUISITES

Prerequisite(s): Registration in Level IV or V of an Engineering Physics program

### INSTRUCTOR OFFICE HOURS AND CONTACT INFORMATION

**Dr. A. Turak**
JHEA 321
turaka@mcmaster.ca
ext. 23448

**Office Hours:**
Monday – 1:30 pm
Or by appointment

### TEACHING ASSISTANT OFFICE HOURS AND CONTACT INFORMATION

Kai Groves < groveskj@mcmaster.ca

### COURSE WEBSITE/ALTERNATE METHODS OF COMMUNICATION

http://avenue.mcmaster.ca/
https://journals.mcmaster.ca/mjep

### COURSE OBJECTIVES

By the end of this course, students should be able to:

- Critique chief technical challenges and critical materials issues for nanotechnology in Engineering Physics
- Present effective written analysis of solution to technical challenges
- Examine the state of the art of photonics, microelectronics and nuclear technologies
- Analyze and critique academic literature relating to photonics, microelectronics and nuclear technologies
- Present effective critical analysis of the state of the art
- Evaluate effective critical analysis

### MATERIALS AND FEES

**Required Texts:** none

## COURSE OVERVIEW

Recent advances in areas of nanotechnology relevant to engineering physics, including approaches to nanoscale fabrication, characterization, design, machinery and materials, will be discussed and critiqued, in a workshop/conference format. Throughout the semester will be specified resource days/sessions, including expert speakers, on critical assessment of literature, writing for publication, presentation skills, etc to aid students in presenting and critiquing effectively. Students will have an opportunity to write and received feedback on a short, letter format paper (4 pages) related to their own research interest.

| **Resource Topics** | Resources |
|---|---|
| Topic 1<br>**Topic selection**<br>**How to write an article in 5 weeks** | Handout – Parts of a scientific paper<br>Kai Groves |
| Topic 2<br>**How to read literature critically** | Handout – Critically evaluating scientific papers |
| Topic 3<br>**Library skills** | Handout – Reading Scientific papers<br>Andrew Calgoni – Thode Librarian |
| Topic 4<br>**How to write a publication level article** | Handout – Writing a paper for publication<br>Handout -- Writing errors to avoid<br>Handout -- Writing a Scientific Paper: From Clutter to Clarity<br>Handout -- Elements of Style for Writing Scientific Journal Articles<br>Video lecture: Writing scientific article resources |
| Topic 5<br>**How to make effective presentations** | Kai Groves |
| Topic 6<br>**Peer reviewing** | Handout - Peer review The-nuts-and-bolts 2015<br>Handout – Peer review checklist<br>Video lecture: How to review an article |

## ASSESSMENT

| Component | Weight |
|---|---|
| Assignments | 5% |
| Presentations | 37% |
| Presentation peer-reviews | 8% |
| Article | 40% |
| Peer-review reports | 10% |
| Total | 100% |

## ADDITIONAL DETAILS REGARDING COURSE MANAGEMENT AND ASSESSMENT

- **Major due dates**:
  Article 1st submission deadline: Nov 23rd
  Peer review deadline: Nov. 29th
  Article resubmission deadline: Dec 14th
- **How work is to be submitted**:

Work for assignments must be submitted in person as a hard copy or through dropboxes on Avenue to Learn. The presentations **must** be submitted in soft copy through Avenue to Learn; the article and peer review **must** be submitted in soft copy through the McMaster Journal of Engineering Physics website (journals.mcmaster.ca/mjep).

- **Policies on missed work, extensions, and late policies**
  1. Late hand-ins for assignments will be penalized by 10% for each day, except with prior permission from the instructor. Permission must be obtained at least two days in advance of the deadline to waive the hand-in penalty.
  2. The schedule of presentations will be determined based on the number of students. If you are not able to present on the day(s) you are assigned, you will get a zero. With advance notification (at least 2 days), there will be a 10% deduction for every session you delay your presentation.
- **Attendance requirements**:
  Attendance is mandatory, especially at the presentations which include a peer marking component, and especially at the review committee session at the end of the semester.
- **Class participation expectations**:
  Class participation is expected through the asking and answering of questions throughout the term, as well as a substantial peer evaluation process. For the presentations, there is a peer evaluation component. Everyone is expected to mark everyone else's presentations, and this will be counted toward your presentation peer-reviews. The peer marks will be averaged into the final mark for the presentation.
- **Civil society policy**
  The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

## ACCREDITATION LEARNING OUTCOMES

The Graduate Attributes defined in this section are measured for Accreditation purposes only, and will not be directly taken into consideration in determining a student's actual grade in the course.

| Attributes | Indicators |
|---|---|
| **01 - A KNOWLEDGE BASE FOR ENGINEERING** | 01.4 - Competence in Specialized Engineering Knowledge |
| **09 - IMPACT OF ENGINEERING ON SOCIETY AND THE ENVIRONMENT** | 09.1 - Identifies and quantifies the full range of short-term, long-term, local and global impacts of their engineering projects on society, including: economic aspects; social, cultural, and human health aspects, and; ecosystem integrity aspects. |
| | 09.2 - Addresses uncertainties in the prediction of interactions on society and the environment in a structured and transparent manner. |
| | 09.3 - Assesses possible options and design configurations from a sustainability engineering perspective, which emphasizes environmental stewardship, life-cycle analysis, and long-term decision-making principles. |

| | |
|---|---|
| **12 - LIFE-LONG LEARNING** | 12.1 - Critically evaluates and applies knowledge, methods and skills procured through self directed and self identified sources, including those that lie outside the nominal course curriculum.<br>12.2 - Shows an awareness of the wide range of engineering societies, literature, conferences, and other information sources. |

## ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

## ACADEMIC ACCOMMODATIONS

Students who require academic accommodation must contact Student accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contact by phone at 905.525.9140 ext. 28652 or e-mail at sas@mcmaster.ca. For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities.

## NOTIFICATION OF STUDENT ABSENCE AND SUBMISSION OF REQUEST FOR RELIEF FOR MISSED ACADEMIC WORK

1. The McMaster Student Absence Form is a self-reporting tool for Undergraduate Students to report absences DUE TO MINOR MEDICAL SITUATIONS that last up to 3 days and provides the ability to request accommodation for any missed academic work. Please note this tool cannot be used during any final examination period.
2. You may submit a maximum of 1 Academic Work Missed request per term. It is YOUR responsibility to follow up with your Instructor immediately (NORMALLY WITHIN TWO WORKING DAYS) regarding the nature of the accommodation. Relief for missed academic work is not guaranteed.
3. If you are absent for reasons other than medical reasons, for more than 3 days, or exceed 1 request per term you MUST visit the Associate Dean's Office (JHE/A214). You may be required to provide supporting documentation.

4. This form must be submitted during the period of absence or the following day, and is only valid for academic work missed during this period of absence.
5. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
6. You should expect to have academic commitments Monday through Saturday but not on Sunday or statutory holidays. If you require an accommodation to meet a religious obligation or to celebrate an important religious holiday, you may submit the Academic Accommodation for Religious, Indigenous and Spiritual Observances (RISO) Form to the Associate Dean's Office. You can find all paperwork needed here: http://www.eng.mcmaster.ca/current/documents.html

## NOTICE REGARDING POSSIBLE COURSE MODIFICATION

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

## TURNITIN.COM STATEMENT

In this course we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their wok to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to http://www.mcmaster.ca/academicintegrity/.

## ON-LINE STATEMENT FOR COURSES REQUIRING ONLINE ACCESS OR WORK

In this course, we will be using Avenue to Learn, the MJEP website, or email. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

## REFERENCE TO RESEARCH ETHICS

The two principles underlying integrity in research in a university setting are these: a researcher must be honest in proposing, seeking support for, conducting, and reporting research; a researcher must respect the rights of others in these activities. Any departure from these principles will diminish the integrity of the research enterprise. This policy applies to all those conducting research at or under the aegis of McMaster University. It is incumbent upon all members of the university community to practice and to promote ethical behaviour. To see the Policy on Research Ethics at McMaster University, please go to http://www.mcmaster.ca/policy/faculty/Conduct/ResearchEthicsPolicy.pdf.