CS-M00 Research Methodology
Lecture 1: Introduction

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http://www.cs.swan.ac.uk/~csetzer/lectures/researchmethodology/14/index.html

September 30, 2014
Welcome
1. Overview over the Module

2. Coursework Submission System

3. Research Culture in Computer Science
1. Overview over the Module

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Terminology

In my lectures

- “Generalists” means “MSc in Computer Science”.
- ACS means MSc in Advanced Computer Science (including specialisations),
Handbook

- Handbook, Module handbook, Scheme handbook, induction lecture will be made available at Blackboard:
  Blackboard → Mystudies → Computer Science Student Information → General Information

- All lectures, handouts etc of this module should be made available on blackboard.
  - Might not always work because of many different lecturers involved.
Synopsis

“This module consists in lectures and seminars about

• fundamental research methodologies and
• good practice in research,
• formulation of research questions and hypotheses,
• logical reasoning,
• literature research,
• proper acknowledgement of sources,
• principles in carrying out experimental research.”
General Structure

- Mixture of lectures by
  - Anton Setzer (Safe and Secure Systems, General Material)
  - Stephen Lindsay (HCI)
  - Jason Xie (Visual Computing)
  - Chris Whyley (MSc Project and academic integrity)
- In addition Tutorials (biweekly) led by tutors grouped by schemas (generalists, ACS and specialisations).
- Weeks in the following as in the college timetable, where week 1 is the first week of actual lectures starting Mon 29 Sept 2014.
- Week 1-6 of lecturing: Lectures on various aspects of research methodology.
- Week 7 - 9: Presentations by students in tutorials.
- Week 10: More lectures, including lecture on MSc project (Chris Whyley).
This year the tutorials have been booked centrally, and appear therefore as CS-M00 slots.

Only the lectures on Tuesday 2pm and Friday 1pm in week 1 - 6 and 10 will be lectures for all students.

After we have received module and specialisation selection forms on Monday 6 October, a tutorial allocation will be made. You will then be told which tutorial slot you need to attend.

The schedule for presentations in week 7 - 9 will be...
• CS-M00 is evaluationed by coursework only:

• Students will carry out a small research project.
  • Could be an essay about a computer science topic.
  • Highly recommended: a proper mini-project: 
    a small programming exercise, a small user study, a small mathematical proof, or something similar.

• Students in ACS with specialisations should if possible have a project linked to their specialisation.

• It is recommended that generalists find a topic which combines their first degree with computer science.
Assessment

- Mini project allocated in cooperation with the tutor
  - One essay or project report (50 %)
  - One talk (50 %)
- Each student in a tutorial group should have a different topic.
- The length of the essay should be 2000 - 3000 words.
  - In case of a miniproject involving some technical work such as programming, it can be shorter.
- In week 7 - 9 (starting 10 November) students have to give their presentations.
Adding Depth to Reports

For obtaining good marks in reports make sure you add depth.

- Be **innovative**. Present something new, have your own creative ideas.
- **Evaluate** your results.
- Cover the following points
  - **What** are you presenting? (Be concise, but give all the facts).
  - **Why** are you presenting it? (Why did you choose this over what?)
  - **Compare**.
    (Compare your approach with others; give advantages and disadvantages of your approach; it is good to be on a factual level self critical; be objective).
- Ask your tutor (and later supervisor) for assistance early on.
Choice of Specialisations

- Students in ACS please hand in by **Monday 6 October 2014** in Student Information Office:
  - Module and Specialisation Selection Form (ACS) or Module Selection form (generalised MSc).
  - The module and specialisation selection form for ACS needs to be signed by the coordinator of the specialisation you want to move in, **only if you want to change specialisation**
    - Open specialisation: John Sharp,
    - Software Technology: John Sharp,
    - Safe and secure systems: Anton Setzer,
    - Visual Computing: Jason Xie,
    - HCI: Stephen Lindsay
  - **Needed for making tutorial allocation.**
• Tutorials will be allocated after we have the module and scheme selection forms during next week.
  • Some for generalist MSc.
  • For ACS groups organised by specialisations (some specialisations might be grouped together).
  • Possibly mixing of both.
Disclaimer

Most of the pictures used in this lecture are downloaded from the internet.
They are not my original work.
1. Overview over the Module

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Rules for Coursework Submission

- College of Science requires zero tolerance for coursework deadlines.
  - If you don’t submit it on time (even if you are 1 minute late) you get 0%.
  - The only exception is if you have extenuating circumstances.
  - A special procedure has to be followed if you want to claim extenuating circumstances.
- All paper coursework deadlines will be at the given day (Mo - Fri) at 11:00.
- Most electronic submission are via Blackboard.
  - Turnitin will check for plagiarism.
Rules for Coursework Submission

• All paper courseworks need to be submitted to a specific drobbox.
  • For computer science coursework should be the wodden box near the Student Office in Faraday Building.
• All paper coursework needs to be submitted with a cover sheet which contains a specific bar code for you.
  • Please print it out ahead of time, not in last minute.
  • Shortly before 11:00 large queues for printing out are to be expected.
• The following is the procedure as it is at the time of writing those slides. It is likely that there will be changes.
  • Please refer to https://science.swansea.ac.uk/intranet/help/students/coursework for latest updates of instructions.
Coursework Submission

- Instructions at https://science.swansea.ac.uk/intranet/help/students/coursework
- Login to College Intranet at https://science.swansea.ac.uk/intranet/
- This will then show you a list of all coursework due for you.
Courseworks

This page lists all your courseworks, grouped by status.

Current

You should have received the assignment details for these courseworks. When you have completed each piece of work, click the appropriate 'Submit' link and print the cover sheet that's displayed.

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>Title</th>
<th>Deadline</th>
<th>Cover sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-170</td>
<td>Dr. A. Beckmann</td>
<td>Winning Strategies</td>
<td>Oct. 7, 2011, 11 a.m.</td>
<td></td>
</tr>
</tbody>
</table>

Future

These courseworks will be handed out later in the year. The title and dates are subject to change, but should give you a rough idea of forthcoming workload.

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>Title</th>
<th>Set Date</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-130</td>
<td>Mr. C. Whitley</td>
<td>Report 1</td>
<td>Oct. 24, 2011</td>
<td>Nov. 29, 2011</td>
</tr>
</tbody>
</table>
The following only applies to coursework submissions by paper (not electronic submissions).

Find coursework, click “Cover sheet” link.

You will get a preview of cover sheet.

Print out the Cover Sheet from your browser.

Staple it to your course work
Coursework Submission Cover Sheet

Please print this page and staple it securely to the front of your coursework. The coursework should then be submitted before the deadline to the dropbox in 2nd Floor Student Reception, Faraday Building.

Penalty Waiver

If you intend to submit this work after the deadline and have good reason for doing so, you can submit a penalty waiver application.

Penalty waiver application: ☐

The waiver application form should be stapled securely to the evidence you have for the late submission and submitted as soon as possible to a teaching administrator in 2nd Floor Student Reception, Faraday Building.

Print Cover Sheet

College of Science

Swansea University

Module CS-170

Coursework Winning Strategies
College of Science
Coursework Submission

Module CS-170

Coursework Winning Strategies

Lecturer Dr. Arnold Beckmann

Deadline 07 Oct 2011 11:00

Student Number 123456

By submitting this work, you agree to the following statement:

"I am aware of the University policy on unfair practice and I certify that this coursework is the result of my own independent work except where otherwise stated, and that all other sources are explicitly acknowledged."

This cover sheet should be securely stapled to the front of your work, and then submitted before the deadline to the dropbox in 2nd Floor Student Reception, Faraday Building.

Generated at 14:20 04/13/15.
Handing in

- Hand in at submission box.
- Afterwards check email for a receipt.
Submission Box

Only for computer science submissions
Check for any notes and emails about Changes
Hi John,

Your coursework for CS-170 has been received.

Details:
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Module: CS-170
Coursework: Winning Strategies
Deadline: 07 Oct 2011 11:00
Received: On time

This receipt is available online at https://science.swansea.ac.uk/intranet/submission/receipt/20fba
Late Submission

- If you need to submit late with a valid serious reason you can apply for penalty waiver.
- The penalty waiver application is a separate cover sheet you print and hand in to the student office with any supporting evidence (e.g. doctor’s note).
- To print the penalty waiver form, click on “Penalty waiver application” and print the page.
- Penalty waiver application can be printed after you printed the cover sheet (but should usually be handed in with the coursework).
Submission via Blackboard

- Sometimes you can submit coursework via Blackboard.
- Note that not all formats are acceptable (check beforehand; pdf should always work).
- Text documents (reports, essays etc) often are to be submitted via turnitin.
  - Turnitin is a very advanced system which finds similarities of texts in your document with books, articles, webpages, even coursework submitted before via blackboard.
  - The university is very strict regarding plagiarism (see lecture by Chris Whyley later in CS-M00).
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3 Main Methodologies

- Theoretical Research.
  - Thinking.
  - Foundations of Computer Science.
    - E.g. “What is a program?”.
    - What kind of data types do exist?
  - Developing new ways of solving problems.
    - New algorithms.
    - New programming paradigms.
    - ...
- Mathematical Research.
  - A lot of proofs carried out.
  - E.g.: Prove that algorithm A is better than algorithm B.
  - Prove that it is possible to decide that this program is correct.
3 Main Methodologies (Cont.)

- Experimental Research.
  - User Studies.
  - Software Experiments.
- Software Production.
  - Usually experimental software
  - Trying out new algorithms, paradigms, programming languages.
However most of it is

Thinking Thinking Thinking
Ideas

- Creative Process.
- Ideas usually have roots in other ideas.
- Inspirations from others.
- Inspiration from other fields inside computer science, outside computer science.
- Or even arts, travelling.
Example: Greek Philosophy

- Greek philosophy origins from colonies close to Turkey, exposure to other cultures.
- Many researchers have been exposed to different cultures in early childhood.
  - Parents moving to other countries.
  - Being part of a minority in a country.
Exchange of Ideas
Conferences
Conferences, Workshops

• A lot of research happens at conferences, workshops.
• From two to several thousands participants.
• Small workshops, large conferences.
• Some high prestigious by invitation only.
  • Oberwolfach (Germany)
  • Dagstuhl (Germany)
  • NII Shonan Meeting (Japan)
Most happens during coffee breaks, lunches, dinners. Coffee breaks often more important than lectures.
My own experience

• Good lectures give rise to new ideas even if I don't understand what the lecturer is talking about.
Other Forms of Collaborations

- Sabbaticals.
- Visits to Research Institutes.
  - Institute for Advanced Studies (Princeton).
  - Newton Institute (Cambridge).
  - Mittag-Leffler Institute (Stockholm).
  - ...
- Research visits.
  - Between 1/2 day and several years.
- Seminars, colloquia.
Scientific Journals

- Typically called
  - Journal of ... (Journal of Symbolic Logic)
  - Annals of ... (Annals of Pure and Applied Logic)
  - Archive of ... (Archive of Mathematical Logic)
  - Transactions of ... (ACM Transactions on Human-Computer Interaction).
  - Acta ... (Acta Informatica)
  - Many more.
Scientific Journals

- Most published by scientific publishers.
  - E.g. Elsevier, Springer, ...
  - Subscriptions very expensive.
  - Access to electronic subscriptions at Swansea
    - On campus.
    - Off campus through Athens.

- Increasingly open access journals.
  - Produced by the scientific community.
  - Reason: Most articles submitted in directly publishable form.
    - No need for process of editing.
  - Why pay if publishers don't add much to it.
Proceedings

• Proceedings of Conferences
  • Often published in
    • Springer Lecture Notes in Computer Science.
    • Electronic Notes in ... (e.g. Electronic Notes in Theoretical Computer Science).
  • Many other outlets.
  • Usually refereed.
  • Often highly competitive (acceptance rates e.g. 20 %, 10 %).
Referee Process

- Submission of article to an Editor.
- Editor sends it to Referees.
- Referees write anonymous reports.
- Editor decides about
  - Revised version required
  - Rejection
  - Acceptance.
Festschrift

- Festschrift = German for “Festive publication”.
- Proceedings in honour of somebody famous.
  - Typically 60th, 65th, 70th, 75th, ... birthday
  - or retirement
- Sometimes not of highest quality (no thorough referee process).
- Sometimes very high quality.
Good Way of Searching Quality Scientific Articles

Enable “Get it at Swansea” in Settings of Google Scholar
(Get it at Swansea will often link you directly to the doi pages)
Look for Doi pages (Document Object Identifier)
Identifying Electronic Versions of Scientific Articles

Look at pages of publishers

- Springer: Springer Link.
- Elsevier: Science Direct.
- ACM: ACM Digital Library.

The university has often subscriptions to articles, so you can get the official versions.

- It sometimes works directly when you are on campus.
- If you are off campus you get the same rights if you make a VPN connection to the campus network.
- Otherwise (including sometimes when on campus) you need to find institutional login on the doi pages to Swansea University via Athens or Shibboleth.
- Athens contains a password hint (use your email credentials).
References to Articles

- Always collect good references to your articles (best obtained via publishers webpages).
- If you have access to the official version from the publisher, that’s preferred.
  - Many authors have their version online, but that’s often not the final version, especially it usually has not the correct page numbers.
- If you have webpages, always record the webaddress and date of download, so that you can find it again later, and create good references later.
Main Motivation for Doing Research

• It’s fun.
• Enthusiasm.
• Being amongst highly creative people.
• Going to the limit of human consciousness.
• It benefits society.
  • Top universities are hot beds for innovative companies.
Research and teaching go hand in hand.
Although research often beyond what is taught, it influences teaching.
A researcher often shows not so much by what s/he is teaching, but how s/he is teaching, behaving, acting, thinking...

Be Inspired