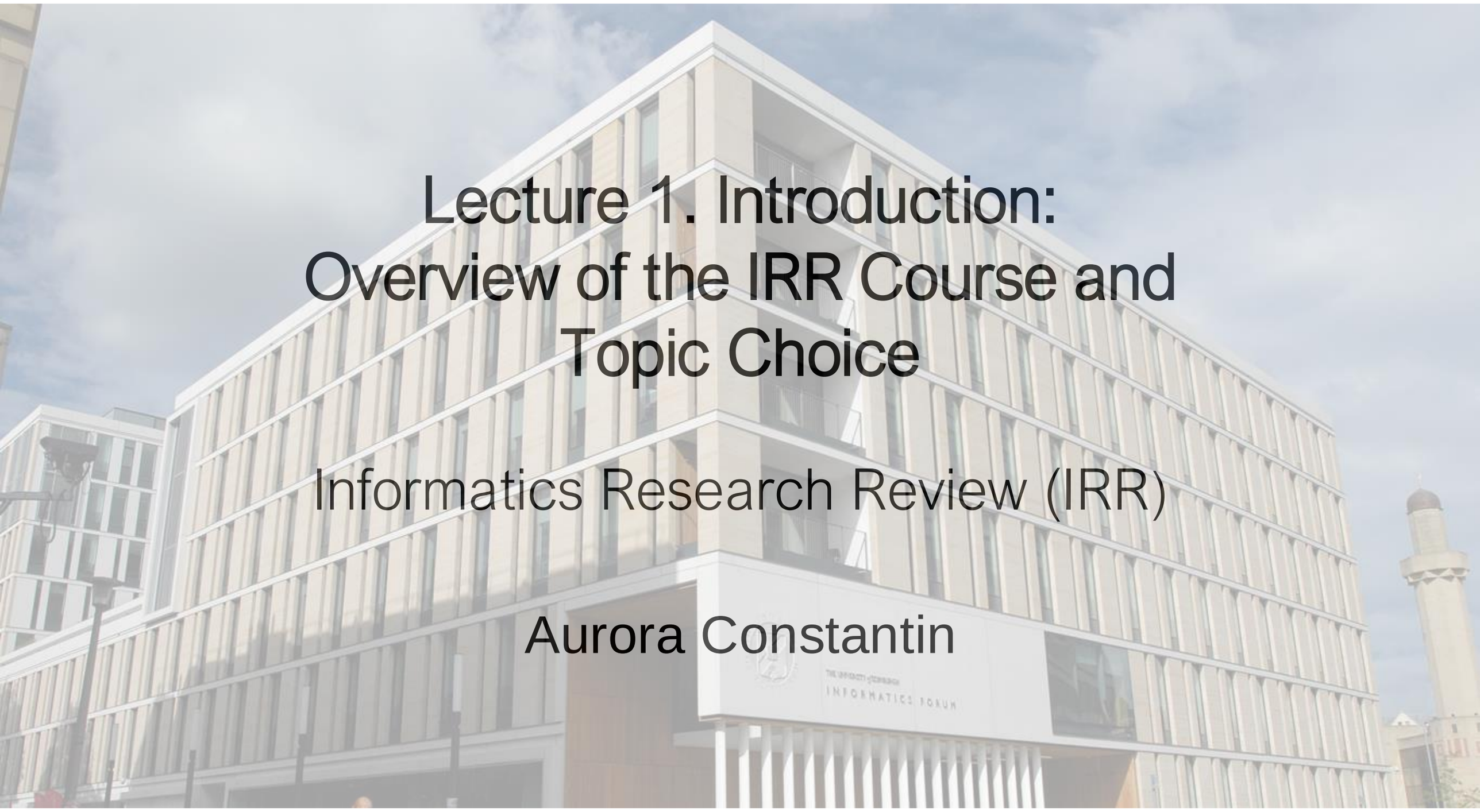
THE UNIVERSITY of EDINBURGH
informatics



Lecture 1. Introduction: Overview of the IRR Course and Topic Choice

Informatics Research Review (IRR)

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Based on and adapted from earlier versions by Armstrong, Anderson, Franke van Rossum, Bundy, Lavrenko, and Viglas

IRR Course Team

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1.1 Overview Content

- **Essential information about IRR**
- **Wider context of IRR**
- **Organisation of IRR**
- **FAQ**

Key points

- 10 credit course. Approximately 100 hours of work total.
- Runs through the semester 1 (and into next semester).
- Assessed by coursework only (final submission in sem 2)
- Part of the research component in your MSc.
- Largely self-managed and very personal.

Leaning outcomes

On successful completion of this course, you should be able to:

1. Select literature in the chosen area appropriate for the review subject, and critically evaluate research literature in the chosen area.
2. Search, and use appropriately, databases of scientific literature.
3. Evaluate and search traditional library resources.
4. Discuss a research topic in detail leading to new hypotheses.
5. Deliver a detailed and balanced report on a research topic.

Wider Context of IRR

- **Taught component (100 credits)**
  - Lectures, tutorials, coursework, exams
  - Learn established techniques that work
- **Research component (80 credits)**
  - Do something that has never been done before
    - Study a new problem, develop a new method, etc.
    - Probably the most exciting (and hardest) part of MSc
  - ***Dissertation*** (**60 credits)**
    - 20-40 pages in Informatics
  - **Two courses prepare you:**
  - **IRR: literature review in your broad area of interest (10 credits)**
  - IPP: write a detailed plan for your specific MSc project (10 credits)

Your research year

- **Semester 1 (IRR)**
  - Learn about a relevant area: **explore** research papers
  - Write a 10-page **critical review** of what you learned
  - *All research projects start with a literature review so we know what has already been done and what options exist that we can build on.*
- **Semester 2 (Project selection and IPP)**
  - Research staff supervisors propose **project topics** or
  - You submit a self-proposal
  - IPP: Develop and write a detailed research project plan
- **Summer**
  - Work on your **project** (design, build, test, analyse results)
  - Write a **dissertation**

Organisation of IRR

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	…	Sem 2 W1	Sem2 W2
Lectures – in person	✓	✓			✓	✓	✓							
Q&A Sessions			✓	✓				✓	✓	✓				
Tutorials			✓	✓	✓	✓	✓	✓						
IRR draft submission for feedback from ELE*													✓	
IRR draft submission for feedback from tutors*													✓	
Coursework (IRR) submission														✓

* *These deadlines are provisional*

Lectures

Week	**Lecture Topic** ***(Lecturer)***
W1	Lecture 1: **Introduction** *Aurora Constantin*
W2	Lecture 2: **Academic Reading** *David Caulton*
W5	Lecture 3: **Referencing and Avoiding Plagiarism** *Murray Cole & Aurora Constantin*
W6	Lecture 4: **Academic Writing** *David Caulton*
W7	Lecture 5: **Writing a Good Research Revie**w *Aurora Constantin*

Tutorials

- Tutorials focus on **generic** skills for reading and writing a review (e.g., analyse and synthetise findings, organise an argument)
- Meet every week, from week 3 to week 8
- To change your tutorial group, you need to complete a GCRF form direct to TTU:

  https://www.edweb.ed.ac.uk/timetabling-examinations/timetabling/personalised-timetables/group-change-request
- Tutors are there to help you. Take benefit from that
- Attendance is mandatory: ignore meetings = fail IRR

Tutorials – elevator pitches

- A key element of reviewing literature is to **condense the key findings** into a very short and ideally engaging narrative
- Each week each student should deliver a single short **‘elevator pitch’** on a topic relevant to the tutorial.
  - Each pitch should have between 50 -100 words
  - Post your pitch on Piazza – we will pick up 1-2 examples to discuss at the beginning of each tutorial

Coursework

- IRR is assessed entirely by one piece of coursework
- Students work individually to produce an Informatics Research Review (10 pages) on a topic of their choice.
- Marking: pass/fail, based on a set of criteria
- Template will be provided

Course Materials

- All the materials for the course will be made available on the IRR OpenCourse (OC) page.
- There is a link from the IRR Learn page to the IRR OC page
- Materials from lectures and recordings of all lectures and Q&A sessions will be linked from OpenCourse.
- Among the resources on the OC page there is a collection of IRRs from last year.

Learning Style

- An important part of IRR is to help you develop an **independent learning style:**
  - You choose the direction
  - You decide how you will work
- You need to choose a **Topic –** this is difficult, and we will help with this
- You will earn skills of research reading, gathering evidence and marshalling it to write up in scientific style. Key skills are:
  - Critical Thinking, and
  - Constructing an argument to justify your thinking.
- **Your tutor facilitates, they don't direct you**

FAQs

Q: Does IRR need to overlap with my course choices?

A: No, but it often does.

Q: Does my project need to be in same area as IRR?

A: No, again but it often does

Q: Does my project need to be in line with course choices?

A: No, but be careful you have the required expertise/skills.

Q: I am part-time, when do I do my IRR/IPP?

A: IRR any year, IPP ideally same year as project.

Q: Can I reuse my IRR later in the literature review chapter of the IPP and/or MSc dissertation?

A: If you want, you can reuse content from your IRR, but phrased in a different way (i.e., paraphrase) to avoid self-plagiarism.

1.2 Topic Choice Content

- **What a literature review is?**
- **What IRR is?**
- **What a topic is?**
- **How to select and narrow down a topic?**

Literature Review

Definition - a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. It includes a critical evaluation of the material.

Purpose - "to build an argument, not a library" [1]

Important: A literature review is *not* a series of annotations (like an annotated bibliography)

> *"...in essence, like describing trees when you really should be describing a forest. In the case of a literature review, you are really creating a new forest, which you will build by using the trees you found in the literature you read."* ([2, p72] the difference between an annotated bibliography and a literature review)

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[1] (Rudestam, K.E. and Newton, R.R. (1992) Surviving your dissertation: A comprehensive guide to content and process. California: Sage, p49)

[2] Galvan, J. (2006). Writing literature reviews: a guide for students of the behavioral sciences (3rd ed.). Glendale, CA: Pyrczak Publishing.

What a Literature Review Is Not?

- a list of all articles that you have read about the subject
- a summary of the articles you have read about the subject
- an exhaustive list of all articles that have been written about the subject
- a summary of everything that has been written about the subject

Goals of a Literature Review

- Understand the **state-of-the-art**
  - What is current substantive knowledge?
  - What are the most important questions?
  - What research has been done most recently?
  - Who is doing the research?
  - What are they investigating?

- Identify **current methodological knowledge**?
  - What research methods are being used?
  - What tools and techniques are being used?
  - How are results being analysed?

Why Do a Literature Review?

- Help you understand current work in the field
  - Provide an overview of key concepts
  - Identify major relationships or patterns
  - Identify strengths and weaknesses
  - Identify any gaps in the research
  - Identify any conflicting evidence
- Can assist with understanding of theoretical or practical problem and/or hypothesis
- Provides a firm foundation for your work
- Helps identify your (novel) contribution
- Increases chances of paper being accepted

Rules for Writing a Literature Review*

1. Define a Topic and Audience

2. Search and Re-search the Literature

3. Take Notes While Reading

4. Choose the Type of Review You Wish to Write

5. Keep the Review Focused, but Make It of Broad Interest

**** From: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715443/***

Rules for Writing a Literature Review*

6. Be Critical and Consistent

7. Find a Logical Structure

8. Make Use of Feedback

(9. Include Your Own Relevant Research, but Be Objective)

10. Be Up-to-Date, but Do Not Forget Older Studies

**** From: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715443/***

IRR Rubric

Topic and Motivation (LO1 & LO4)

Academic Writing (LO5)

Quality of Argumentation (LO1 & LO4)

Quality and Use of Referencing (LO2 & LO3)

Quality of Conclusion and Future Work Direction (LO4 & LO5)

Exceptionality

LO1. Select literature in the chosen area appropriate for the review subject, and critically evaluate research literature in the chosen area.

LO2. Search, and use appropriately, databases of scientific literature.

LO3. Evaluate and search traditional library resources.

LO4. Discuss a research topic in detail leading to new hypotheses.

LO5. Deliver a detailed and balanced report on a research topic.

What is a topic?

- In general, a Research Review topic should aim to answer a **question**.
- The research review states the question and then it **uses** the **current state of knowledge** in the research community to provide an answer to the question.
- At its simplest, the question might be:

“What is the state of the art in area X?”

Or, probably better, it might be something more specific like:

“What is the role of simulators in the development of Autonomous Vehicle systems.” or,

“How can data from continuous integration contribute to governance?” or,

“How has deep learning been applied to legal decision support?”

Choosing a topic

(*from https://guides.lib.umich.edu/c.php?g=283300&p=2915110*

What are the constraints?

- IRR is a 10-credit course, so you are expected to spend around 100 hours on the tasks.
- The IRR is expected to be max 10 pages in length.
- The IRR will be assessed by the IRR rubric that requires some features are present in the IRR.
- You may be doing this for the first time and so there is a lot to learn...

What are the pitfalls?

- The topic is insufficiently well defined.
- You are not really interested in the topic.
- There is not much literature about the topic that is of guaranteed quality (i.e. some peer-reviewed papers published in good venues).
- The topic is too broad – there is far too much literature.
- You do not have the right background to understand the papers.
- So you need to find a topic that:
  - interests you, that you have a sound technical background in, that has a rich (but not too rich) good quality, literature and is well defined.

What strategies can I use?

- You should be driven by interest. Your IRR will be easier to write and easier for a reader to read if you have a genuine interest in the topic.
- You might start out with a broad topic and narrow it a bit by looking at literature, but you need to get it to fit into 10 pages... what is to be done?
- There are three principle strategies:
  - You can narrow the domain of application you are looking at.
  - You can narrow the range of techniques you are looking at.
  - You can narrow the range of phenomena of interest.

Narrowing

- Suppose we start with: “What is the role of simulators in the development of Autonomous Vehicle systems.”
- We could narrow the domain to unmanned aerial vehicles (UAV): “What is the role of simulators in the development of UAV systems.”
- We could narrow the techniques to concentrate on integrating operational data, to get: “What is the role of simulators in integrating operational experience into the development of UAV systems.”
- Then we might try narrowing the phenomena we are concerned with to be something like collision avoidance, to get: “What is the role of simulators in integrating operational experience into the development of collision avoidance in UAV systems.”
- Depending on your topic and literature this may get you to a feasible IRR topic.

Where do I start?

- Always start with **your interest**!
- Some Degree Programmes have **specific guides**. On the IRR Learn page look at *Course Materials>>Resources and Reading >> Topic Guidance Resources*
- **Discuss** with other students and your tutorial group members.
- Staff in the School of Informatics have contributed to a list of so-called "**seed papers**" (On Learn in *Course Materials>>Resources and Reading >> Topic Guidance Resources).* These are papers that staff think are good starting points for a search. You can look at papers they refer to and (using a citation index) you can find papers that cite seed papers.
- As an alternative you can also **use review journals** such as ACM Computing surveys as a useful source of current knowledge of active research in our discipline. You can find it here:

  https://dl.acm.org/journal/csur

  This provides good quality surveys of topical areas of interest.

Questions

If you have questions, please:

- ask your question during the live session
- ask the tutor of your group
- post your question on the Piazza forum
- email the TA (x.ruan-3@sms.ed.ac.uk)
- email me (Aurora.Constantin@ed.ac.uk)
- make an appointment to see me