SCIENTIFIC METHODS

AISHA UMAIR

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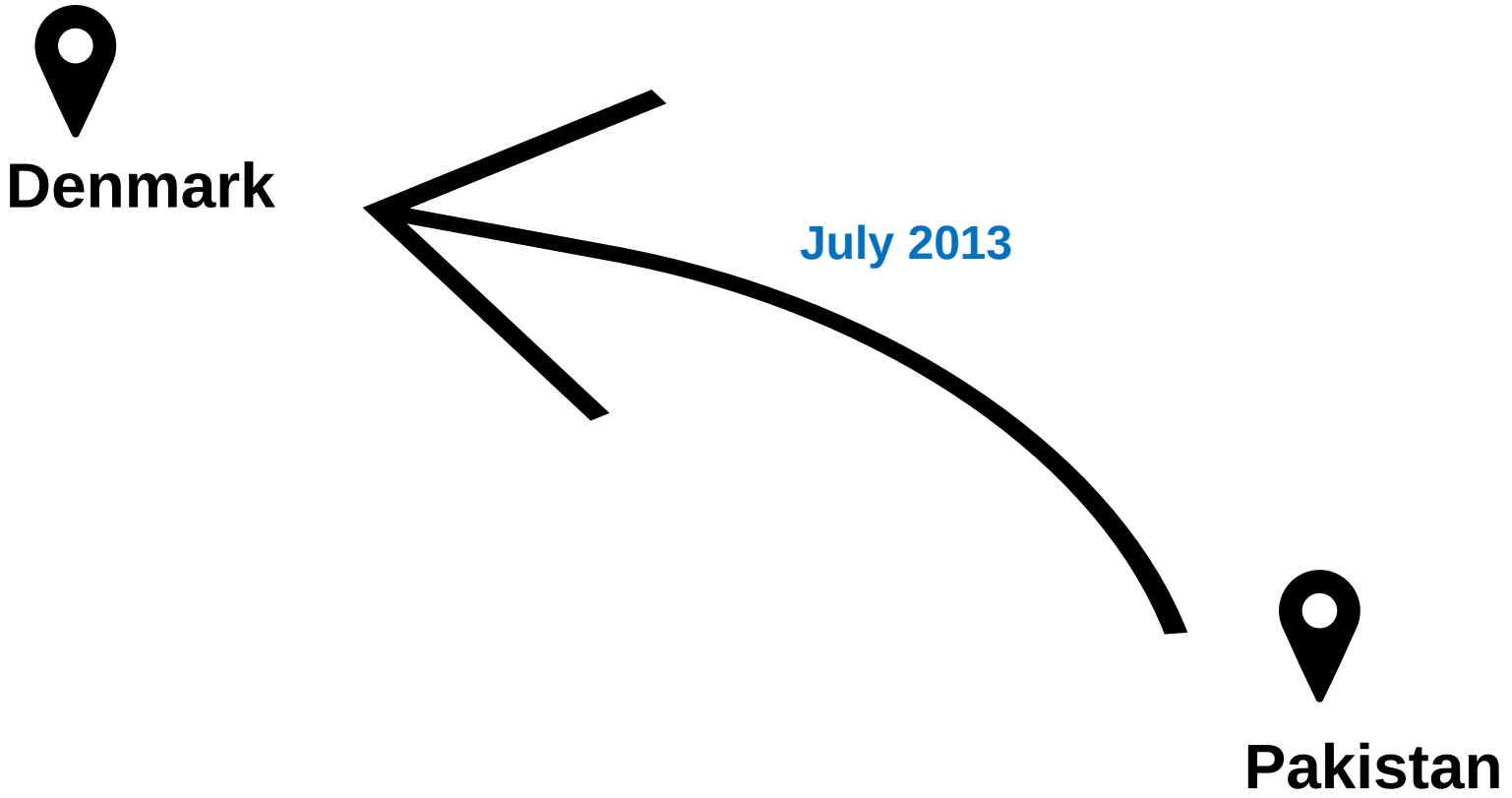
ABOUT ME

AISHA UMAIR



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ABOUT ME

AISHA UMAIR

- PhD. in Software Engineering from Syddansk Universitet (SDU)

  PhD Project: Coordination Protocol for System of Cyber-Physical Systems

- Associate Professor, SDU Software Engineering, MMMI

  Research Interests:

  - Multi-Objective Optimization
  - Coordination Protocols
  - Agent Based Systems
  - Social Welfare Metrics

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Responsibilities

- Teaching
  - Scientific Methods (Master: 1st Semester)
  - Advanced Object-Oriented Programming (Bachelor: 2nd Semester)
- Supervision
  - MS Thesis supervision
  - BS SE/ST Final Year Projects' supervision
  - BS SE/ST Internship Projects' supervision
- Administrative Tasks
  - BS Semester-1 SE/ST Coordination
- Lecture Training Program Course
- SDU Representative for Diversity Initiative Project
- Educational Research Projects, i.e., Automated feedback and corrections

Migrating Monolith to Microservice Architecture

Identifying similar or identical images using reverse image search

Automated Sales Optimisation using Google Analytics Data

Topic Classification using Machine Learning

Estimating Freezers alarm pressure based on historical weather data using Machine Learning

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MAIN CONTACT

- Aisha Umair (aiu@mmmi.sdu.dk)
- If you have any queries outside the lecture, please send an e-mail.
- If face-to-face meeting is required outside the lecture, please book an appointment

COURSE INFORMATION

LEARNING OBJECTIVES

The student is able to:

- Independently **find literature** on a specific research topic and conduct systematic literature review
- Identify **qualitative and quantitative research** approach and choose between them appropriately
- Explain **qualitative data collection and data analysis** approaches
- Explain **quantitative data collection and data analysis** approaches
- Demonstrate **ethical approach** and research integrity in their own research
- Identify **common threats** to quality of research and describe the validity and reliability of their own research
- Present**, both orally and in writing**, the research process for a specific research topic, findings, and conclusion in a coherent and concise manner.
- Write a **scientific report** covering a specific research topic using academic writing format and required content.

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TOPICS TO BE COVERED

- Introduction to research approaches
    - Qualitative and Quantitative
- Systematic Literature Reviews
- Qualitative and Quantitative Research Methods and Analysis
- Research Ethics
- Validity Threats
- Tips on Academic Writing

WHAT YOU WOULD BE DOING?

- Participate in in-class exercises/discussions
- You will do a mini research project
  - Choose a research topic
  - Find (relevant) literature for the given topic
  - Plan and design the study
  - Execute the study
  - Present the results of your study both oral and written
  - Perform peer-evaluation on each others' work

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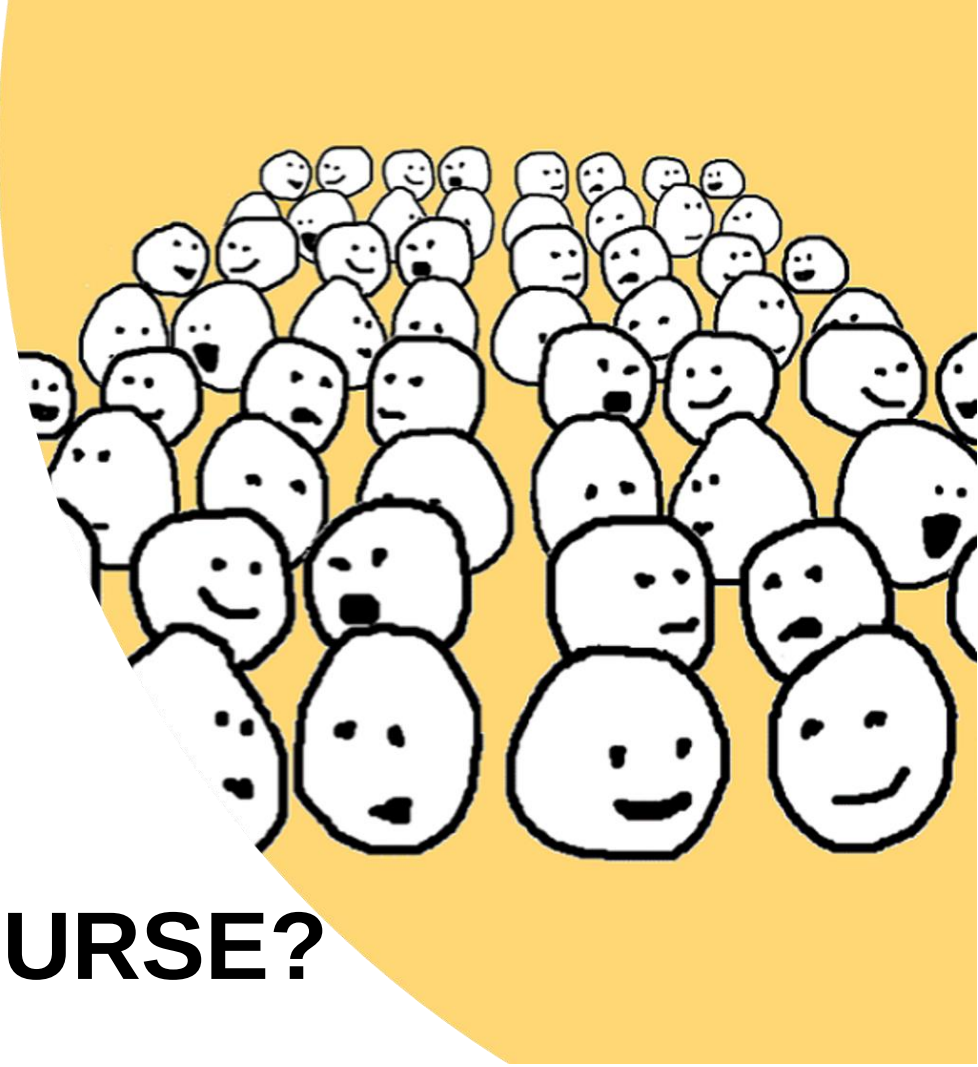
Think – Talk - Share



WHAT DO I GET OUT OF THIS COURSE?

&

WHAT IS IT GOOD FOR?

COURSE FORMAT

- 12 lectures
- 10 lectures (2h lecture + 2h class activity)
- Class activity could be in-class exercise or project work
- Mandatory Class activities:
  - 3 manadatory in-class exercises (submission required)
  - 2 in-class exercises (no submission required)
  - Group project presentation & peer feedback

Note:The last two lectures are scheduled for project presentations

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SCHEDULE

- W. 36 (6th Sept) – Welcome and Introduction to the course
- W. 37 (14th Sept) - Introduction to research and philosophical views
- W. 38 (21th Sept) - Theory, research problem, and selecting research approach
- W. 39 (28th Sept) - Research ethics + Topic discussion
- W. 40 (5th Oct) - Evidence based software engineering
- W. 41 (11th Oct) - Guest lecture on information retrieval
- W. 42 (19th Oct) - (No lecture) **(Submit: research plan)**
- W. 43 (26th Oct) - Qualitative research methods
- W. 44 (2nd Nov) – PP Day (No lecture)
- W. 45 (9th Nov) - Quantitative research methods
- W. 46 (16th Nov) - Validity threats
- W. 47 (23rd Nov) - Peer review and academic writing **(Submit: report draft: 23rd Nov)**
- W. 48 (30th Nov) – Project presentations
- W. 49 (7th Dec) – Project presentations
- W. 51 (20th Dec) - **Submit final report**

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Mini Research Project

You need to plan, execute and report a research project.

Research plan.

- You need to write a plan that describe the topic,
- the study aim,
- research question,
- what method you choose,
- what you expect to produce and
- the time plan.

Project Presentation:

- You also need to present your project verbally and be prepared for a Q&A.
- When it’s not your day of presentation, you will act as an evaluator of another group’s project.

Research report (examination)

- You need to write a report of the methods and results of your research project.

PEER EVALUATION

- You will evaluate a report from another group

  - Which group to evaluate? (will be decided later)
  - Come up with suggestions for improvements for their report.
  - Also, think about questions that you ask them to clarify which is not clear from the report.
  - Be nice and constructive.
  - Suggestions regarding spelling and grammars ONLY are not acceptable.

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DELIVERABLES

- **In-class exercise report**, 5 of the lectures include exercises (3 mandatory but not graded).
  - Low effort report, where you just need to show that you participated in the exercise
- **Research Plan** (not graded but mandatory for the acceptance of the Final Report)
- **Final Report** (mandatory and graded as a final exam on the 7-point grading scale

Note: All deliverables are submitted through Itslearning (except the final report)

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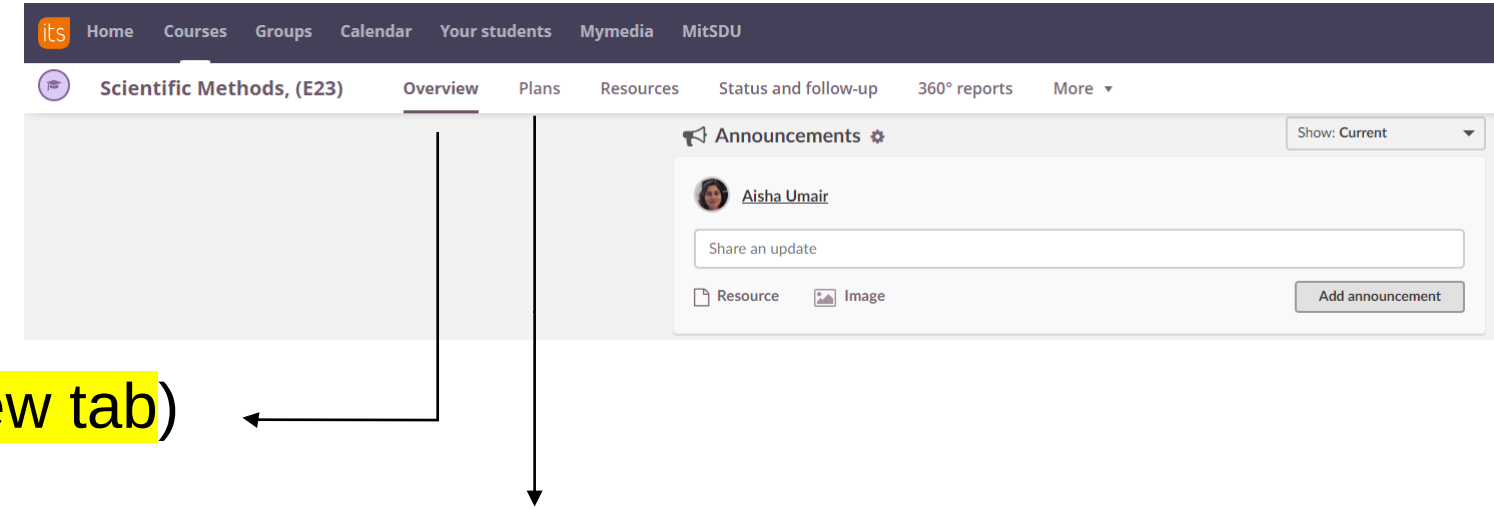
itslearning



- Post announcements (Overview tab)
- Assignment description and submission (Plans tab)
  - (In-class) Exercise description and submission.
  - Project proposal submission
- Slides, reading materials, and links to reading materials (Plans tab).

IMPORTANT DATES

- Research plan: 19-10-2023
- Research report draft: 23-11-2023
    - Submitted via itslearning + to your peer group
- Presentation: 30-11-2023 and 7-12-2023
- Research report final: 20-12-2023
    - Submitted via Digital Exam

Research Topics????

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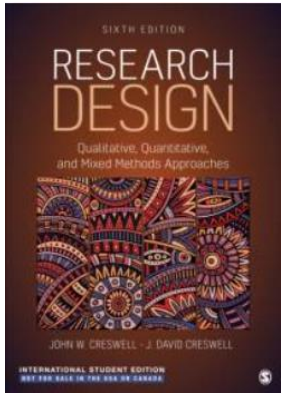
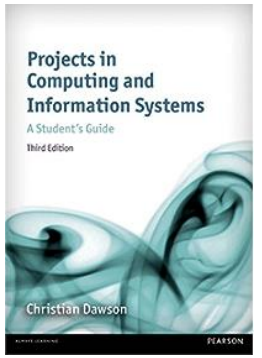
LITERATURE

Main:

- Creswell J.W., and Creswell, J.D. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sixth Ed. Sage Publishing



- Dawson, C. (2009) Projects in Computing and Information Systems: A Student's Guide, Second Ed. Addison Wesley. Third edition is available.



- Supplementary Material:
  - Provided on ongoing basis corresponding to the topic.

Next Lecture Topic:

Framework for research

Any Question?????