

# IS8006: DESIGN SCIENCE AND EMPIRICAL RESEARCH IN INFORMATION SYSTEMS

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## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Design Science and Empirical Research in Information Systems

### Subject Code

IS - Information Systems

### Course Number

8006

### Academic Unit

Information Systems (IS)

### College/School

College of Business (CB)

### Course Duration

One Semester

### Credit Units

3

### Level

R8 - Research Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

IS8006M Design Science and Empirical Research in Information Systems

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course introduces technical research methodologies in IS in two parts.

The first half of the class is to assist students understand the typical research methodologies found in the IS design research areas including information modelling, algorithm and framework design, design theory, design science supported empirical analysis, among others.

The second half of the course covers empirical research strategies for causal inference. We will specifically examine the discovery, analysis, and evaluation of naturally-occurring experiments. We will introduce, explain, and illustrate different causal inference strategies including naturally-occurring randomized experiments, instrumental-variable designs, and regression-discontinuity designs.

### Course Intended Learning Outcomes (CILOs)

| CILOs |  | Weighting (if app.) | DEC-A1 | DEC-A2 | DEC-A3 |
|-------|--|---------------------|--------|--------|--------|
| 1     | Explain the nature of contemporary design science research in IS.                                | 20                  | x      |        |        |
| 2     | Evaluate and critique the current design science research directions in IS.                      | 20                  | x      | x      |        |
| 3     | Understand a variety of causal inference methods for empirical research.                         | 20                  | x      | x      |        |
| 4     | Implement a variety of causal inference research designs for IS research                         | 20                  | x      | x      |        |
| 5     | Develop design science or empirical research proposals following suitable research methodologies | 20                  | x      | x      |        |

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Learning and Teaching Activities (LTAs)

| LTAs |               | Brief Description  | CILO No.   | Hours/week (if applicable) |
|------|---------------|--|------------|----------------------------|
| 1    | LTA1: Seminar | <p>The following items form the content of the lecture:</p> <ol style="list-style-type: none"> <li>1. Introduction of design science research frameworks</li> <li>2. Overview of current areas of design science research</li> <li>3. Evaluation and critique of sample work in design science research from top IS journals</li> <li>4. Introduction to a variety of causal inference methods for empirical research</li> <li>5. Evaluation and critique of sample work of empirical research from premium business and economics journals</li> </ol> | 1, 2, 3, 4 |                            |

**Assessment Tasks / Activities (ATs)**

| ATs  | CILO No.   | Weighting (%) | Remarks ("- for nil entry) | Allow Use of GenAI? |
|--|------------|---------------|----------------------------|---------------------|
| 1<br>AT1.Discussion and Participation<br>The lecture consists of discussions to assess students' understanding of the chosen research areas. Each student is expected to show their abilities through the discussions. | 1, 2, 3, 4 | 40            | -                          | Yes                 |
| 2<br>AT2.Literature Presentation<br>Each student is required to conduct extensive literature review in the chosen areas. Each student is required to give presentations of selected readings                           | 1, 2, 3, 4 | 30            | -                          | No                  |

|   |   |            |    |   |    |
|---|---|------------|----|---|----|
| 3 | AT3.Proposal Presentation<br>Each student is required to develop a research design and give presentations of the design, which demonstrate his/her ability in solving problems in a particular research area. | 1, 2, 3, 4 | 30 | - | No |
|---|---|------------|----|---|----|

**Continuous Assessment (%)**

100

**Examination (%)**

0

**Minimum Continuous Assessment Passing Requirement (%)**

50

**Minimum Examination Passing Requirement (%)**

0

**Assessment Rubrics (AR)****Assessment Task**

AT1. Discussion and Participation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 &amp; thereafter)

**Criterion**

Ability to explain the nature of contemporary design science research in IS.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

**Assessment Task**

AT1. Discussion and Participation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 &amp; thereafter)

**Criterion**

Ability to understand a variety of causal inference methods for empirical research.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT2. Literature Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to evaluate and critique the current design science research directions in IS.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT2. Literature Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to evaluate and make causal inference research designs for IS research

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT3. Proposal Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to apply appropriate methodologies to solve design science research problems.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT3. Proposal Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to apply appropriate causal inference methodologies to solve empirical problems.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT3. Proposal Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Capability to develop comprehensive design science or empirical research proposals following suitable research methodologies.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT1. Discussion and Participation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to explain the nature of contemporary design science research in IS.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT1. Discussion and Participation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to understand a variety of causal inference methods for empirical research.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT2. Literature Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to evaluate and critique the current design science research directions in IS.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT2. Literature Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to evaluate and make causal inference research designs for IS research

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

AT3. Proposal Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to apply appropriate methodologies to solve design science research problems.

**Excellent**

(A+, A, A-) High

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(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

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**Assessment Task**

AT3. Proposal Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to apply appropriate causal inference methodologies to solve empirical problems.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

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(B-, C+, C) Moderate

**Failure**

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**Assessment Task**

AT3. Proposal Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Capability to develop comprehensive design science or empirical research proposals following suitable research methodologies.

**Excellent**

(A+, A, A-) High

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(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

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## Part III Other Information

### Keyword Syllabus

1. Design Science: evolution and status of design science research; nature and characteristics of design science research; research frameworks for design science research; areas of current design science research; characteristics of good design science research.

2. Empirical Research: the potential outcome framework, randomized experiments, linear regression, instrumental variable designs, regression discontinuity designs, difference-in-differences.

**Reading List**

**Compulsory Readings**

| Title |  |
|-------|--|
| 1     | Classic and recent papers from top journals, which will be selected and provided in the class. |

**Additional Readings**

| Title |     |
|-------|-----|
| 1     | Nil |