GRADUATE CERTIFICATE IN ARCHITECTING SCALABLE SYSTEMS

BRIEFING ON PRACTICE MODULE (SE31FT)

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Total Slides: 13

Agenda

- Objectives
  - To brief the participants of the graduate certificate on the requirements, conduct and assessment of the practice module

- Topics
  - Requirements of Graduate Certificate
  - Requirements of Group Project
  - Selection of Group Project
  - Typical Examples of Group Project
  - Assessment of Graduate Certificate
  - Proposal for Group Project
  - Progress Report for Group Project

Requirements of Graduate Certificate–1

Objectives

You will learn how to architect scalable, robust and reliable ubiquitous systems using the latest Cloud-based technology. The focus is on how to architect the back-end support for large systems and platforms.

Outcomes

Demonstrate **competency** in all **three** course modules as well as **DevSecOps** practices.

Course Module	Focus
Architecting Software Solutions	Techniques to architect software solutions by focusing on business requirements and quality attributes. Architect for Security, performance and capacity planning.
Platform Engineering	Design and manage robust API access to platforms, perform domain analysis for reusable assets. Manage platform operations and data.
Cloud Native Solution Design	Architecting and designing Cloud native Solutions. Use of Cloud services and infrastructure to build robust and scalable solutions.

Requirements of Graduate Certificate–2.

Means of demonstrating competencies in the three courses:

- Demonstrate understanding and mastery of the skills taught in the above course modules in a **group project (50%)**

- Pass a **written examination (50%)** based on the scope of the above course modules

__Notes__: Competencies in the individual courses are demonstrated using assessments during the specific courses. Participants have to separately pass both the group project and written examination

Requirements of Group Project–1

Nature of the project

- To architect, design and build a **Platform** capable of enhancing the ecosystem of a business
- Demonstrate **Scalability** of the platform architecture
- Architect and build the platform as a **Cloud** native application and make use of appropriate services of Cloud architectures
- Design and script appropriate **automation** of development and deployment activities
- Build minimally required **security** controls
- Build at least one **application** to demonstrate the platform capabilities

Deliverables

- Working system
- Code base (e.g., Git archive, GitHub repository URL)
- Project Report (*template will be provided*)
  - Design and Architecture of the solution including key architectural decisions
  - Quality attributes and strategies
  - DevOps and development lifecycle
  - etc.
- DevOps pipeline scripts and test scripts

Requirements of Group Project–2.

- About 10 man-days of effort per participant is expected

- Rough schedule is shown below (*some dates are tentative*)

Date	Agenda	Description
3 Oct 2023	Module Briefing	The participants are briefed on the requirements, conduct and assessment of the practice module
8 Oct 2023	Proposal Submission	The participants submit their proposals for review by the lecturers; earlier submissions are welcome
10 Oct 2023	Proposal Review	The lecturers provide the review comments. The participants revise the proposals, if necessary, and kick start their projects
11-31 Oct 2023	Project Conduct	The participants conduct their projects and consult the lecturers on issues. Each group submits a fortnightly progress report for review by the lecturers
1 & 3 Nov 2023	Project Presentation	The participants present their projects
15 Nov 2023	Report Submission	The participants submit their project report, incorporating remarks gathered during their project presentations
19 Oct 2023	Clinic Session	The lecturers summarize the courses and conduct Q&A
8 Nov 2023	Written Exam	The participants attend the written examination (open book)

Selection of Group Project

- Participants are to form a group of **4-5 members** by signing up to a *Team* in Canvas by 8 Oct 2023
  - Canvas course: *ISS_SWE5001_SE31FT: Architecting Scalable Systems – Practice Module (SE31FT)*

- Participants are to **source** for suitable projects, either from within your **own organisations**, your **own ideas** or from **other approved sources**

- A **suitable** project is one that adequately **utilises and demonstrates** the skills learned in the course modules

- Submit a **Project Proposal** for your team to assignment *PM Project Proposals* in Canvas
  - Lecturers will provide **guidance** by reviewing the suitability of the project
  - **Earlier** submission and approval allows earlier conduct of the project

Proposal for Group Project

- The proposal should include the following content

Section	Content
Project Title	Title
Project Sponsor	Name, title, contact (if applicable)
Project Members	Names
Overview	Describe the context and the business problem solved by the platform
General Architecture	Describe the general architecture of the platform. It can be a logical architecture if the deployment details are not decided yet. The architecture serves as the context for your scope
Scope of Work	Describe the platform components (seed, producers, consumers etc.) and the use cases that you will include in your project. Explain in detail how your implementation will demonstrate scalability, cloud native design, DevOps and platform engineering
Effort Estimates	List the rough WBS tasks and their estimated efforts. This is to ensure that you have thought about the approach and the implementation effort

Questions to Consider

1. What are the **pain points** of my current company in expanding its business ecosystem? Or as an entrepreneur, what are the pain points that I wish to solve?

2. How do I architect the **Platform** to expand the business ecosystem? What are the common services and functionality as well as reusable libraries and frameworks?

3. What would be the **benefits** if a new use case is developed on the platform instead of being developed from scratch? The benefits can include effort reduction, better software quality attributes (better security, scalability, maintainability, less defects). How can these benefits be demonstrated?

4. What is the **scale** that my architecture can support? How can I demonstrate/prove that it can handle such a scale?

5. How can I **demonstrate** my claim on the technical and non-technical benefits of my design and architecture?

6. What is the value of using **cloud native** design? How can I demonstrate the value achieved by designing the system using cloud native design?

7. Which part of software development lifecycle can be **automated** and how it can reduce the development effort?

8. Is the amount of **effort** needed to do the implementation still within the guideline?

Typical Examples of Group Project–1

Project: iJooz E-Wallet and QR Code Purchase

Problem description:

Fruits Vending Pte Ltd is a premium smart vending machines manufacturer and operator in Singapore. They specialize in providing freshly squeezed orange juice vending services to the customers with consistent, excellent quality at competitive prices. In order to reduce Cash Payment and Promote "i.Jooz QR Code" Cashless Payment a QR code platform is proposed. Customers purchasing the QR code can split the amount stored in the QR code with family and friends. This platform can be used for other businesses for similar functionality.

Success criteria:

- Identify the seed, producers and consumers of the QR code platform.

- Identify the use cases that can be beneficial in expanding the ecosystem

- Identify how the platform can be useful in scaling the number of customers and producers of the platform.

- The support for more seeds in future.

- Identifying and performing appropriate analytics to improve the functionality and performance of the platform

Typical Examples of Group Project–2.

Project: Travista

Problem description:

In recent years we have seen high growth in travellers and people are keen to explore new place, enjoy native things and activities around the places but booking them whole travel itinerary has become troublesome for them which takes up lots of their time and require intensive efforts to search various website and manual work to build one travel plan. This new platform will provide single point solution for the traveller to book flights, hotels and activities tickets as a package which fits their budget. It will also provide services that can be customized for the customer's specific requirements. The platform is designed using scalable system architecture with DevOps which allows the system to reach more people as it demands and ongoing introducing new feature at faster pace and make easier maintenance and collaborating the with external vendors.

Success criteria:

- Identify the seed, producers and consumers of the travista platform.

- Identify the use cases that can be beneficial in expanding the ecosystem

- Identify how the platform can be useful in scaling the number of customers and producers of the platform.

- The support for more seeds in future.

- Identifying and performing appropriate analytics to improve the functionality and performance of the platform

Assessment of Graduate Certificate

Assessment Component	Weight (Company Sponsored)	Weight (Not Company Sponsored)
Final Presentation	15%	20%
Project Report	25% (including 10% peer assessment)	30% (including 10% peer assessment)
Company Sponsor Assessment	10%	0%
Written Examination	50%	50%
Total	100%	100%

- The presentation and project report would be graded by a team of ISS lecturers

- The participant must **separately pass with a minimum score of 40%** (i.e., Grade D) for both the group project and written exam

- The participant must attain a **minimum overall score of 50%** (i.e., Grade C) to be awarded the **Graduate Certificate** in Architecting Scalable Systems

- The participant must attain a **minimum overall score of 60%** (i.e., Grade B-) to be eligible for the certificate to stack to a **Master of Technology** degree

  - Entry into the Master of Technology degree programme is not assured whatever the score attained in a Graduate Certificate, but is solely at the discretion of NUS-ISS

Progress Report for Group Project

- Submit team progress report to assignment *PM Progress Reports* in Canvas **weekly** for review by NUS-ISS

- The progress report should at least include the following content

Section	Content
Project Title	Title
Date	Date of report
Summary of Work Done	List of tasks conducted since last report
Effort Expended	Hours expended by each member since last report
Problems Encountered	Issues that might need assistance from NUS-ISS lecturers
Plan for the Next 1 Week	List of tasks planned for the next 1 week