SERVICE ORIENTED SOFTWARE DEVELOPMENT

1. Thông tin về học phần (General Information)

Tên học phần (Course name):   Service-oriented Software Development

Mã học phần (Course code):   INT1448_CLC

Số tín chỉ (Number of credits):   3

Loại học phần (Course type):   Compulsory

Học phần tiên quyết (Prerequisites):

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, microphone and speaker, air conditioner.

- Laboratory:

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lectures (lí thuyết):   36h
- Exercises (bài tập):   0h
- Projects (bài tập lớn):   08h
- Lab (thực hành):   0h
- Individual reading (tự đọc):   01h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.

- Phone number: (024) 33510432

2. Mục tiêu và chuẩn đầu ra (Objectives and Learning outcomes)

2.1. Mục tiêu (Objectives)

Về kiến thức (Knowledge):

This course discusses the basic concepts, theories, and techniques for service-oriented computing, standards related to Web services, and approaches for the description, discovery, and composition of Web services. The course includes an introduction to two main approaches in the development/deployment of web services (SOAP and RESTful), and the differences between the

approaches will also be detailed. The course aims to formulate the foundational concepts of services, evaluate existing approaches, and present existing techniques from other areas that can be adopted for services. Emerging techniques for addressing challenges that are unique to services will be discussed in this course.

Kỹ năng (Skills):

Upon completing this course, learners will be able to develop service-oriented software based on SOAP or REST approaches.

Thái độ, Chuyên cần (Attitude):

Learners are required to attend the classes and complete assignments/projects.

2.2. Chuẩn đầu ra (Learning outcomes)

After studied this courses, learner could:	
1.	[LO1]: Understanding fundamental concepts, theories, and techniques in service-oriented computing.
2.	[LO2]: Understanding analysis and modeling service use SOAP and REST approaches for developing service oriented application
3.	[LO3]: Understanding design patterns and service paradigms relevant to the development and deployment of web services.
4.	[LO4]: The skill to analysis, design and implement service-oriented software based on SOAP or REST approaches

Content / Learning outcomes	LO1	LO2	LO3	LO4
Chapter 1: Service-Orientation	X			
Chapter 2: Building up the Service-Oriented Solution	X	X	X	X
Chapter 3: Analysis and Modeling Service	X	X		X
Chapter 4: Design Service API and Contract	X		X	X
Chapter 5: Service API and Contract Versioning	X			X

3. Tóm tắt nội dung học phần (Description)

Service-oriented Computing (SOC) is the new promising cross-disciplinary area of distributed computing that represents heterogeneous distributed software applications as a collection of services or software agents that can communicate freely with each other. The course aims to provide the knowledge, including theory and practice, to design, develop, architect, and consume software applications or components. The main contents of course are the principle technologies like Web Services, Service-oriented architecture, REST Service, and Contract versioning.

This course seeks to discuss the key concepts for service-oriented computing. It intends to formulate the foundational concepts of services, evaluate existing approaches, present existing techniques from other areas that can be adopted for services, and lastly introduce emerging techniques for addressing challenges that are unique to services.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1 Service-Orientation

    1.1. Introduction to Service-Orientation

        1.1.1.   Service-Orientation principles

        1.1.2.   Goal and benefits of Service-Oriented Computing

        1.1.3.   Four Pillars of Service-Orientation

    1.2. Service Oriented Architecture (SOA)

    1.3. Characteristics of SOA

    1.4. Common types of SOA

        1.4.1.   Service Architecture

        1.4.2.   Service Composition Architecture

        1.4.3.   Service Inventory Architecture

        1.4.4.   Service-Oriented Enterprise Architecture

    1.5. SOA Project and Lifecycle Stages

Chapter 2 Building up the Service-Oriented Solution

    2.1. Introduction to Service Layers

    2.2.Services and Microservice

        2.2.1.   SOAP Web Service

        2.2.2.   REST Service

        2.2.3.   Microservice

    2.3.Service design pattern

    2.4. Breaking down the Business problem

    2.5. Building up the Service-Oriented Solution

Chapter 3 Analysis and Modeling Service

    3.1. SOAP Web Service and XML

    3.2. REST Service and JSON

    3.3. Microservice

    3.4. Analysis and Modeling Process

        3.4.1.   With SOAP and Microservice

        3.4.2.   With REST and Microservice

        3.4.3.   Case study Example

    3.5.Case study: Analysis and modeling service from Business process

Chapter 4 Service API and Contract Design

    4.1. Service Model Design Considerations

    4.2. Service Design Guidelines

        4.2.1. SOAP Service

        4.2.2. REST Service

        4.2.3. Microservice

    4.3. Design Service API and Contract

    4.4. SOA platform

    4.5. Case Study: Designing and building a service-oriented application with a specific platform

Chapter 5 Service API and Contract Versioning

    5.1. Versioning Basics

    5.2. Versioning and Compatibility

        5.2.1. Backward Compatibility

        5.2.2. Forward Compatibility

        5.2.3. Compatible Changes

        5.2.4. Incompatible Changes

    5.3. REST Service Compatibility Considerations

    5.4. Version Identifiers

    5.5. Versioning Strategies

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

[1] Thomas Erl. Service-Oriented Architecture: Analysis and Design for Services and Microservices, 2nd Edition, 2017

5.2. Học liệu tham khảo (Optional Textbooks)

[2]. M. Papazoglou. Web Services and SOA: Principles and Technology, 2nd Edition. 2012

[3]. Robert Daigneau. Service Design Patterns: Fundamental Design Solutions for SOAP/WSDL and RESTful Web Services. Addison-Wesley Signature. 2011

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần (Grading Policy)

Grading method	Percentage	Group/Individual

- Attendance	10%	Individual
- Exercises	20%	Individual
- Mid-term projects/exams	20%	Group
- Final examination (lab)	50%	Individual

Trưởng Bộ môn

(Head of Department)

Nguyễn Mạnh Hùng

Giảng viên biên soạn

(Lecturer)

Đặng Ngọc Hùng