Faculty of Engineering, Environment and Computing
6003CEM Web API Development

Assignment Brief - Coursework 1 of 2

Module Title **6003CEM Web API Development**	Individual / Group **Individual**	Cohort **AY2024/ 2025**	Module Code **VT6003CEM**
Coursework Title **Software Development Feasibility Study**			Hand out date **2025.02.19(FT)** **2025.02.01(PT)**
Lecturer **CY CHENG (Full Time)** **HC WONG, JANET TSANG (Part Time)**			Due date and time Date: **2025.04.21 (FT)** Online: **23:59:59** **2025.03.31 (PT)** Online: **23:59:59**
Estimated Time (hrs) **25hrs including research and writing** Word Limit* **1000 words**		Coursework type: **Written Report**	% of Module Mark / Credit value assessed: **25% / 5 CATS credits**
Submission arrangement: **online via Moodle** File types and method of recording: **PDF upload to Moodle (with Turnitin supported)** Mark and Feedback date: **2025.04.30 (FT); 2025.04.30(PT)** Mark and Feedback method: **Moodle**			

Module Learning Outcomes (LOs)		
	Learning Outcome	**Assessed?**
1	Demonstrate systematic knowledge of the current state of the art in web technologies being deployed by mainstream businesses to create Web APIs.	**Yes**
2	Demonstrate comprehensive, critical awareness of the research basis of those technologies.	**Yes**
3	Scope, design and implement a simple Web API to solve a given problem.	No
4	Describe how and why Web APIs are more important to business than building web applications from first principles each time one is required.	No
5	Understand and implement Web API security and authentication.	No

Purpose

This assessment is designed to demonstrate your knowledge and critical awareness of the various HTTP-based API technologies available for web application development. A scenario is provided through which you can explain your understanding using examples and evaluations of competing API technologies and architectures. You will demonstrate your understanding of the topic by exploring:

- the benefits and risks of adopting API technologies for application development,
- how the full-stack (API and client) ecosystem is developing at its cutting edge,
- and emerging commercial best practices that API developers should be aware of.

Regarding code implementation, the 6003CEM module focuses on full-stack infrastructure using a RESTful API. However, more comprehensive research, understanding and evaluation of how this and other HTTP-based APIs (such as XML-RPC, JSON-RPC, SOAP, and others*) are used in commercial practice will gain you marks for this assignment.

For an explanation of how the marks are awarded, see the grading rubric at the end of this document.

* RPC = Remote Procedure Call, SOAP = Simple Object Access Protocol

Scenario

You are tasked with helping a mid-sized software company, TechFusion Solutions, modernize its existing infrastructure. The company operates a legacy client-server system that relies on monolithic architecture and SOAP-based APIs, serving desktop clients with limited scalability and outdated user experiences.

The company aims **to transition to a full-stack web application solution to improve scalability, integration capabilities, and user experience**. Your article should provide a comprehensive feasibility study, highlighting the benefits of full-stack architecture while addressing the challenges of modernisation.

The existing system is designed with a centralised system for its stores based on a Windows-based desktop application (C#) and a MySQL database that stores all information and details. The IT department at the company currently develops and manages the software and the database in a small, dedicated internal team.

The solution is going to transition to a full-stack web application architecture with the following characteristics:
1. Replace the monolithic backend with a microservices architecture, leveraging frameworks.
2. Enabling more flexible and efficient data exchange.
3. Backend services for scalability and reliability.
4. Employ a database system to handle modern data requirements.
5. Migrate the desktop client to a responsive web-based frontend (Current stage) and mobile app (Next stage). Therefore, the client application should ensure compatibility across devices (desktop, mobile, and tablet) with modern UI/UX design principles.
6. Support integration with third-party services like payment gateways, CRM tools, or data analytics platforms using REST, GraphQL, or Webhooks.

Assessment Task

Your manager has tasked you with producing a **software development feasibility study** for the client, outlining the pain points for the existing system, proposing a solution with a brief evaluation supported by published academic articles available and making a clear justification for the design. Your manager has emphasised that you should make clear the costs/risks and the benefits of any software development recommendations you make in the report.

The submitted report should be 1000 words, excluding references/appendices/tables, and must be uploaded in PDF format. The report should contain:

1. Brief introduction/abstract. (around 100 - 150 words)
2. Analysis of current system (around 150 – 200 words)
3. A solution recommendation for the client, tech stack and architecture design with a clear justification and supported by diagrams. (around 600-750 words)
4. Challenges and Risk Mitigation (around 100 – 150 words)
5. A brief conclusion, including quantifying your confidence level in the proposed recommendation based on your analysis. (around 50 - 100 words)
6. References in correct APA citation style, not less than 5 credible sources, including but not limited to academic journals or research papers, official documentation of technologies and/or industry white papers or case studies.

Guidance

Feasibility studies can be of many types: technical, operational, economic, legal, or schedule/timeline. The report you write for this assessment task should be primarily a **technical feasibility** study: this considers **current resources in terms of hardware and software and their maintenance, the technical skills of the existing team, and the technologies being evaluated for a proposed implementation**.

Resources

You must conduct your independent research to write this report and base it on appropriately cited resources that you find online and through the library. A good starting point for the current state-of-the-art in the HTTP-based API development world is the following industry newsletter, which contains relevant curated links to technical articles and business analysis:

• API Developer Weekly - https://apideveloperweekly.com/

It is recommended that you subscribe to this newsletter and also look through its archive of previous issues to help you understand the types of API technologies and architectures being used and developed, and how these are being integrated into various products and businesses by development teams today.

Submission Process

Please save your final report **as a PDF file** and upload it to Moodle before the deadline above.

Notes:
1. You are expected to use the Coventry University APA style for referencing.
2. Please notify your registry course support team and module leader for disability support.
3. Any student requiring an extension or deferral should follow the university process as outlined here.
4. The University cannot take responsibility for any coursework lost or corrupted on disks, laptops or personal computers. Students should, therefore, regularly back-up any work and are advised to save it on the University system.
5. **Assignments that are more than 10% over the word limit will result in a deduction of 10% of themark i.e. a mark of 60% will lead to a reduction of 6% to 54%.** The word limit includes quotations but excludes the bibliography, reference list and tables.
6. You are encouraged to check the originality of your work by using the draft Turnitin links on Moodle.
7. Collusion between students (where sections of your work are like those submitted byother students in this or previous module cohorts) is taken extremely seriously. It will be reported to the academic conduct panel. This applies to both coursework and exam answers.
8. A marked difference between your writing style, knowledge and skill level demonstrated in class discussion and test conditions and that demonstrated in a coursework assignment may result in you having to undertake a Viva Voce to prove the coursework assignment is entirely by yourself.
9. If you make use of the services of a proofreader in your work, you must keep your original version and make it available as a demonstration of your written efforts. Also, please read the university Proof Reading Policy.
10. You must not submit work for assessment that you have already submitted (partially or in whole),either for your current course or another university qualification, exceptresits, where for the coursework, you may be asked to rework and improve a previous attempt.This requirement will be detailed explicitly in your assignment brief or specific course or module information. Where earlier work by you is citable, i.e. it has already been published/submitted, you must reference it. Identical pieces of work submitted concurrently may also be considered to be self-plagiarism.

Mark allocation guidelines for: software development feasibility study report.

Topic	Description / Breakdown	Marks
Report Structure	**Report structure, grammar, spelling, formatting, references, and reader signposting.**	5
	• Content separated into sensible sections, one topic per section • Figures well laid out, good captions, properly located • Good use of appendices if used • Good standard of language, grammar and definition of technical terms, abbreviations etc. • Proper use of citations and references in CU APA style • Clear introduction / abstract at beginning • Succinct summary / conclusion at end	
Research and References	**Evaluation with supporting materials**	5
	• Relevance and credibility of sources used • rates strengths and weaknesses of each suggested variation with reference supports • Evidence-based arguments and integration of references into the article.	
Solution Recommendation	**Overall solution recommendation and justification**	5
	• Provides a clear recommendation considering the client's needs • Justification is clearly based on the earlier comparative evaluation. • Clearly relates the evaluation of strengths and weaknesses to the current and future commercialneeds of the client • Further details and sensible recommendations for next steps in implementing the solution are given. • Correctly takes in to account current industry trends, state-of-the-art developments, and emergingcommercial best practices around API development. • Shows awareness of genuine risks and costs associated with the recommended solution.	
Suggested Architecture	**Suggested tech stack system architecture**	10
	• A clear system diagram for the architecture of the proposed solution is provided. • Design choices consider the continued need for the client's operations, as well as the new functionality, and show the relations between these. • It is clear which technologies are used in each stack component, including the API itself, the database, and other necessary components. • Data representations and the movement of data into, out of, and within the proposed system areclearly illustrated and/or described. • Clear visualisations and illustrations of the components and relations presented with appropriate descriptive text.	
	TOTAL	**25**

General guidance on marking bands

Mark band	Outcome	Guidelines
90-100% 1st	Meets learning outcomes	1st - Exceptional work with very high degree of understanding, creativity and critical/analytic skills. Evidence of exceptional research well beyond minimum recommended using a range of methodologies. Exceptional understanding of knowledge and subject-specific theories. Demonstrates creative flair, a high degree of originality and autonomy. Exceptional ability to apply learning resources. Demonstrates well-developed problem-solving skills. Work completed with very high degree of accuracy and proficiency and autonomy. Exceptional communication and expression, significant evidence of professional skill set. Student evidences deployment of a full range of exceptional technical and/or artistic skills.
80-89% 1st		1st - Outstanding work with high degree of understanding, creativity and critical/analytical skills. Outstanding understanding of knowledge and subject-specific theories. Evidence of outstanding research well beyond minimum recommended using a range of methodologies. Demonstrates creative flair, originality and autonomy. Outstanding ability to apply learning resources. Demonstrates clear problem-solving skills. Assessment completed with high degree of accuracy and proficiency and high-level of autonomy. Outstanding communication and expression, evidence of professional skill set. Student evidences deployment of a full range of technical and/or artistic skills.
70-79% 1st		1st - Excellent work with clear evidence of understanding, creativity and critical/analytical skills. Thorough research well beyond the minimum recommended using methodologies beyond the usual range. Excellent understanding of knowledge and subject- specific theories with evidence of considerable originality and autonomy. Excellent ability to apply learning resources. Demonstrates consistent, coherent substantiated argument and interpretation. Demonstrates considerable creativity and clear problem-solving skills. Assessment completed with accuracy, proficiency, and considerable autonomy. Excellent communication and expression, some evidence of professional skill set. Student evidences deployment of a highly developed range of technical and/or artistic skills.
60-69% 2:1		2:1 - Very good work demonstrating strong understanding of theories, concepts and issues with clear critical analysis. Thorough research, using established methodologies accurately, beyond the recommended minimum with little, if any, irrelevant material present. Very good understanding, evidencing breadth and depth, of knowledge and subject-specific theories with some originality and autonomy. Very good ability to apply learning resources. Demonstrates coherent substantiated argument and interpretation. Demonstrates some originality, creativity and problem-solving skills. Work completed with accuracy, proficiency, and autonomy. Very good communication and expression with evidence of professional skill set. Student has a thorough command of a good range of technical and/or artistic skills.
50-59% 2:2		2:2 - Good understanding of relevant theories, concepts and issues with some critical analysis. Research undertaken accurately using established methodologies, enquiry beyond that recommended may be present. Some errors may be present and some inclusion of irrelevant material. Good understanding, with evidence of breadth and depth, of knowledge and subject-specific theories with indications of originality and autonomy. Good ability to apply learning resources. Demonstrates logical argument and interpretation with supporting evidence. Demonstrates some originality, creativity and problem-solving skills but with inconsistencies. Expression and presentation mostly accurate, proficient, and conducted with some autonomy. Good communication and expression with appropriate professional skill set. Student consistently demonstrates a well-developed range of technical and/or artistic skills.

40-49% 3rd Class		3rd - Meet the learning outcomes with a basic understanding of relevant theories, concepts and issues. Demonstrates an understanding of knowledge and subject-specific theories sufficient to deal with concepts. Assessment may be incomplete and with some errors. Research scope sufficient to evidence use of some established methodologies. Some irrelevant material likely to be present. Basic ability to apply learning resources. Demonstrates ability to devise and sustain an argument. Demonstrates some originality, creativity and problem-solving skills but with inconsistencies. Expression and presentation sufficient for accuracy and proficiency. Sufficient communication and expression with basic professional skill set. Student demonstrates technical and/or artistic skills.
30-39% Fail		Fail – Very limited understanding of relevant theories, concepts and issues. Little evidence of research and use of established methodologies. Some relevant material will be present. Deficiencies evident in analysis. Fundamental errors and some misunderstanding likely to be present. Limited ability to apply learning resources. Student's arguments are weak and poorly constructed. Very limited originality, creativity, and struggles with problem-solving skills. Expression and presentation insufficient for accuracy and proficiency. Insufficient communication and expression and with deficiencies in professional skill set. Student demonstrates some deficiencies in technical and/or artistic skills.
20-29% Fail	Fails to achieve learning outcomes	Fail - Clear failure demonstrating little understanding of relevant theories, concepts and issues. Minimal evidence of research and use of established methodologies and incomplete knowledge of the area. Serious and fundamental errors and aspects missing Little evidence of ability to apply learning resources. Students arguments are very weak and with no evidence of alternative views. Little evidence of originality, creativity, and problem-solving skills. Expression and presentation deficient for accuracy and proficiency. Insufficient communication and expression and with deficiencies in professional skill set. Student demonstrates a lack of technical and/or artistic skills.
0-19% Fail		Fail - Inadequate understanding of relevant theories, concepts and issues. Complete failure, virtually no understanding of requirements of the assignment. Material may be entirely irrelevant. Assessment may be fundamentally wrong, or with majorelements missing. Not a serious attempt. No evidence of research. Inadequate evidence of ability to apply learning resources. Very weak or no evidence of originality, creativity, and problem- solving skills. Students presents no evidence of logical argument and no evidence of alternative views. Expression and presentation extremely weak for accuracy and proficiency. Communication and expression very weak and with significant deficiencies in professional skill set. Student evidences few or no technical and/or artistic skills