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Series 2025

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Series 2025

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Editors:
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Preface

Pioneering Educational Perspectives: Series 2025 is a collection of thought-provoking insights and research contributions exploring contemporary educational trends and practices. This eBook presents a diverse range of perspectives on innovative teaching methodologies, digital learning strategies, and transformative approaches in education. Designed to serve as a resource for educators, researchers, and practitioners, it aims to inspire meaningful discussions and advancements in the field. Through carefully curated chapters, this publication offers fresh ideas and practical solutions to enhance learning experiences in an ever-evolving educational landscape.

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ENGINEERING DESIGN: A GUIDE TO FINAL YEAR PROJECT (FYP)

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ABSTRACT

The Engineering Design: A Guide to Final Year Project (FYP) is an open course offered through the Universiti Teknologi MARA (UiTM) Massive Open Online Course (MOOC) program. This course aims to provide essential knowledge in mechanical engineering design for students undertaking product design FYPs. It addresses a significant gap in the current diploma syllabus, where mechanical engineering design is not included, resulting in students being inadequately prepared for their projects. Developed using UiTM's MOOC platform, the course content is structured to align with the thesis format, facilitating enhanced understanding and practical application of concepts. The curriculum covers key topics in mechanical engineering design, enabling students to effectively bridge their knowledge gaps. As a result, students who completed the course reported a notable improvement in their ability to execute their FYPs related to mechanical engineering design successfully. In conclusion, this online course has proven effective in equipping students with the necessary skills and knowledge to excel in their product design projects, ultimately enhancing their academic performance and readiness for industry challenges.

KEYWORDS: Mechanical Engineering Design, Massive Open Online Course, Final Year Project

PROBLEM AND OBJECTIVE

Students undertaking final year projects (FYP) in mechanical engineering design frequently encounter significant challenges. A primary reason for these difficulties is the insufficient knowledge of mechanical engineering design, as this topic is not included in the diploma program syllabus. Furthermore, the extensive range of strategies and types of mechanical engineering design processes available in textbooks and journals contributes to confusion. Consequently, students struggle to determine the most appropriate design process for their projects.

To address this issue, it is imperative to introduce a short course on mechanical engineering design processes, specifically tailored to the needs of students engaged in FYP activities. The primary objectives of this projects are:

i. To design an outline specifically tailored for the mechanical engineering design process to meet FYP requirements.
ii. To develop course content that fulfils the knowledge requirements of the mechanical engineering design process.
iii. To assess student perceptions of the course practically, aiding their mechanical engineering design process needs.

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DESIGN DESCRIPTION

The purpose of this course is to provide students with the flexibility to learn about the mechanical engineering design process at their own pace through the UiTM MOOC website (*ENGINEERING DESIGN: A GUIDE TO FINAL YEAR PROJECT (FYP)*, 2023). It aims to equip students with the necessary theoretical knowledge and engineering design tools to apply in their design projects.

The course features comprehensive and structured content, covering all essential chapters typically found in a complete thesis, including Introduction, Literature Review, Methodology, Results and Discussion, and Conclusion and Recommendations. It provides practical tools and resources that students can directly apply to their design activities.

Functionality-wise, the course offers self-paced learning, allowing students to progress at their own speed, which accommodates different learning styles and schedules. It includes interactive resources such as videos, quizzes, and practical assignments to enhance learning and application. Additionally, it fosters a supportive community by providing access to forums and discussion boards where students can interact with peers and instructors.
The target audience primarily includes Diploma and Degree students in Mechanical Engineering, especially those working on their Final Year Projects (FYP). Lecturers can also utilize the course to facilitate supervision activities and provide additional resources to their students.

The unique selling points of the course are its tailored content, specifically structured to align with the requirements of a complete thesis, ensuring comprehensive coverage of the design process. The course is accessible online through the UiTM MOOC website, providing flexibility and convenience. It emphasizes practical application, focusing on tools and resources that students can directly apply to their projects.

VISUALS

Figure 1 displays the thumbnails of the Engineering Design: A Guide to Final Year Project (FYP) from the UFuture MOOC website, while Figure 2 outlines the course content. Notably, the MOOC's Mechanical Engineering Design (MED) framework is structured to align with the FYP format, progressing logically from Chapter 1: Introduction to Chapter 5: Conclusion and Recommendations. This organized approach enables students to effectively plan and execute their design projects, ensuring compliance with both the MED design process and FYP thesis requirements. By adhering to this comprehensive format, students are better equipped to meet the expectations of their final year projects while deepening their understanding of engineering design principles. Additionally, Figures 3 and 4 present feedback from students regarding the course, highlighting their experiences and insights.

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Figure 1: Thumbnails of UFuture MOOC Website

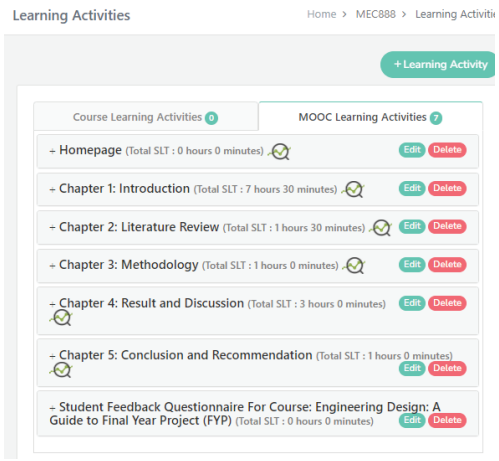


Figure 2: Course Outline Content

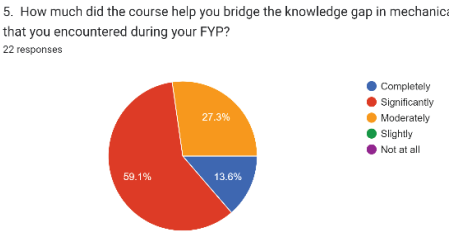


Figure 3: Feedback on Bridging the GAP of MED into FYP application

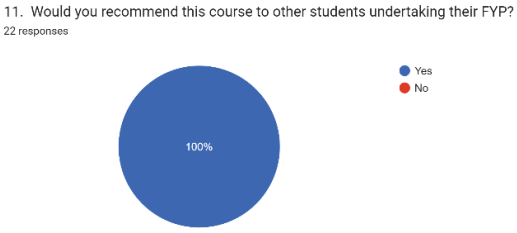


Figure 4: Recommendation of Course to other Students

NOVELTY AND UNIQUENESS

The innovative aspect of this course lies in its unique focus on the application of mechanical engineering design specifically for Final Year Projects (FYP). Unlike existing resources, such as textbooks, courses, or teaching videos, which generally cover the overall process or the entire design methodology, this course concentrates on the essential theories and practical tools tailored to FYP activities and thesis content.

Conventional FYP guidelines often overlook the detailed mechanical engineering design process, while traditional mechanical engineering design textbooks do not cater to the specific needs of each thesis chapter. This course bridges that gap by providing targeted content that addresses the precise requirements of mechanical engineering students working on their FYPs, ensuring specialized knowledge and skills needed to excel in their projects.

BENEFITS TO MANKIND

This course significantly benefits students, lecturers, and society. For students, it equips them with essential knowledge and practical tools to enhance their project outcomes, boosting confidence and problem-solving skills for higher-quality submissions that address real-world challenges and improve quality of life. For lecturers, it provides a structured resource enabling effective supervision and successful project completion. Ultimately, this course fosters a new generation of engineers capable of delivering innovative, sustainable, and impactful design solutions that positively impact society as a whole.

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COMMERCIAL POTENTIAL

This course has significant market potential due to its unique focus on practical application tailored to FYPs. Its competitive advantage lies in addressing the specific needs of mechanical engineering students, unlike traditional resources. Online accessibility through UiTM MOOC ensures scalability, reaching a broad audience. The course can adopt a subscription-based business model, offering cost-effective access to high-quality, specialized content. This approach ensures sustainable revenue while providing valuable educational resources, enhancing employability for graduates and attracting potential partnerships with educational institutions and industries seeking well-prepared engineering graduates.

CONCLUSION

This course specifically tailored to address the knowledge gap in mechanical engineering design for students undertaking FYPs. The course, offered through the UiTM MOOC platform, provides structured content, practical tools, and interactive resources aligned with the thesis requirement. This enables students to effectively apply their knowledge and skills in their projects, leading to improved performance and readiness for industry challenges.

Key findings from this project include the course's effectiveness in bridging the knowledge gap, enhancing student understanding of mechanical engineering design concepts, and improving their ability to execute FYPs successfully. Moreover, the course's online format offers flexibility and accessibility, making it a valuable resource for students and lecturers alike.

Future directions for this project include expanding the course content to cover additional topics in mechanical engineering design, exploring innovative teaching methods and technologies to enhance the learning experience, and conducting further studies to measure the long-term impact of the course on student outcomes and career success.

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ENGINEERING DESIGN: A GUIDE TO FINAL YEAR PROJECT (FYP). (2023). UFUTURE. https://ufuture.uitm.edu.my/courses/summary/MEC888