UNIVERSITI TEKNOLOGI MARA

EXTENDED ABSTRACT

DESIGN INNOVATION ACADEMIC SHOW 2025

InVICCAID 2025
1ST INTERNATIONAL VIRTUAL COMPETITION OF CREATIVE ARTS & INNOVATIVE DESIGN IN TEACHING & LEARNING

MONDARIKA

NIAT
NORTHERN INNOVATION ACADEMIC TOUR

Organized by

Faculty of Art & Design
#perubahanluarbiasa
#ADpilihanpertama

UNIVERSITI TEKNOLOGI MARA
Fakulti Seni Lukis & Seni Reka
Cawangan Kedah

UiTM di hatiku

Collaboration with

PUSAT SAINS NEGARA WILAYAH UTARA

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

EXTENDED ABSTRACT

'Design Innovation Academic Show 2025

DIAS 2025 (Design Innovation Academic Show) is all about "Transcending the Boundaries of Creativity: Innovation in Art & Design for 21st Century Education." This vibrant program shines a spotlight on how creativity and innovation are reshaping modern education.

It consists of three key components. First up is the Mindareka Design Show, an exhibition that showcases students' final year projects and creative designs, giving them a chance to connect with industry professionals and the wider community. Next, we have the Northern Innovation Academic Tour (NIAT), which takes participants on an academic adventure to select institutions and innovation centers in the northern region, aimed at promoting knowledge sharing and building strong academic and professional networks.

Finally, there's the 1st International Virtual Competition of Creative Arts & Innovative Design in Teaching & Learning (InViCCAID), a global competition that recognizes outstanding practices in teaching and learning by blending art, technology, and innovative design. But DIAS 2025 is more than just a talent showcase; it's a powerful platform for empowering both students and educators, while also strengthening collaborations between universities, creative industries, and global communities. With its inclusive and interdisciplinary approach, this initiative strives to spark relevant, competitive, and impactful ideas and innovations that truly benefit society and push the future of education forward.

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Design Innovation Academic Show 2025

Prof. Dr. Roshima Haji Said
Acting Rector
UiTM Kedah Branch

Rector's Message

I am delighted to extend my heartfelt congratulations to the College of Creative Arts, UiTM Kedah Branch, for bringing MINDAREKA 2024 - Unleashing Your Visual Creativity to fruition. The triumphs of past MINDAREKA editions undoubtedly fueled the organization of this year's event, making MINDAREKA 2024 a reality.

MINDAREKA 2024 - Unleashing Your Visual Creativity stands as a testament to the dedication of students at the College of Creative Arts, UiTM Kedah Branch, providing them with a platform to showcase their final art projects. Beyond serving as a space for the exploration of fresh, innovative, and entrepreneurial concepts, this exhibition is poised to connect aspiring talents with potential clients and employers.

I extend my sincere gratitude to all participants whose enthusiasm and support have contributed to the success of MINDAREKA 2024 - Unleashing Your Visual Creativity. Their unwavering belief and commitment have truly brought this event to life, marking it as a resounding triumph!

Head of Faculty Message

Mohamat Najib Mat Noor
Head of Faculty
Faculty of Arts & Design
UiTM Kedah Branch

It is an honour to introduce DIAS 2025 – Design Innovation Academic Show, held under the theme "Transcending the Boundaries of Creativity: Innovation in Art & Design for 21st-Century Education." This significant event reflects the faculty's ongoing commitment to fostering a culture of innovation, critical thinking, and creative exploration among our students and academic community. As we navigate the complexities of the 21st century, it becomes increasingly clear that education must go beyond traditional boundaries to embrace multidisciplinary approaches that are both relevant and future-forward.

The three core components of DIAS 2025, Mindareka Design Show, Northern Innovation Academic Tour (NIAT), and the 1st International Virtual Competition of Creative Arts & Innovative Design in Teaching & Learning (InViCCAID)which is serve as vital platforms to highlight the convergence of design, technology, and pedagogy. These initiatives not only empower our students to showcase their talents and ideas, but also create opportunities for engagement with industry leaders, academic peers, and global collaborators. The Mindareka Design Show celebrates student creativity and innovation through compelling final year projects. NIAT fosters knowledge sharing and institutional partnerships through academic visits and exchanges, while InViCCAID offers international recognition for excellence in integrating art and design into teaching and learning.

I would like to express my deepest appreciation to the organising committee, faculty members, students, and strategic partners who have worked tirelessly to bring this programme to life. Your dedication and collaborative spirit have made DIAS 2025 a reality and a reflection of our shared vision for transformative education. It is my hope that this platform will continue to inspire meaningful dialogue, cultivate groundbreaking ideas, and spark a new wave of innovation that enriches both education and society.

Industrial Design (Bachelor)

FLEXURA | PROSTHETIC LEG

[1] Nur Athirah Binti Mohd Nasir, [2] Hasnul Azwan Bin Azizan @ Mahdzir,
[3] Muhamad Aiman Afiq Bin Mohd Noor

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ABSTRACT

The Flexura Prosthetic Leg is designed to enhance mobility, comfort, and confidence for individuals with lower-limb amputations. Traditional prosthetics often cause discomfort due to loose sockets, rigid ankles, and the added weight of cosmetic leg covers. Flexura addresses these challenges through a lightweight titanium pylon, 3D-printed PLA socket, carbon fiber leg cover, and a wooden foot with a built-in spring mechanism that simulates natural ankle movement. To ensure a secure and personalized fit, the design features an adjustable tightening band, reducing pressure points and preventing instability during prolonged use. The ergonomic form focuses on achieving natural walking motion while minimizing fatigue. The 3D-printed components enable precision customization, reducing weight and improving aesthetics with a streamlined design that eliminates the need for separate cosmetic covers. Soft inner padding in the socket improves comfort, while the spring-loaded wooden foot enhances energy return and flexibility. User feedback emphasized the need for better stability and socket comfort, leading to the integration of dual structural supports, reinforced materials, and the adjustable strap system. By combining advanced materials, modern manufacturing techniques, and user-centered design, Flexura provides a durable, functional, and stylish solution for everyday prosthetic use. Flexura represents a next-generation prosthetic leg that harmonizes function, comfort, and visual appeal. Future developments may explore smart materials or modular ankle systems to further enhance adaptability and performance.

Keywords: Flexura, Prosthetic Leg, Adjustable Socket, Lightweight Design, Comfort.

INTRODUCTION

The Flexura Prosthetic Leg is designed to address common challenges faced by lower-limb amputees, including discomfort, instability, and unnatural gait patterns. Traditional prosthetics often rely on rigid structures that limit flexibility and cause soreness during prolonged use. Flexura improves these issues through a lightweight, ergonomic design and modern materials like titanium, carbon fiber, and 3D-printed PLA. The adjustable tightening band on the socket ensures a secure fit, minimizing the discomfort caused by loose or misaligned sockets.

Flexura's streamlined form resembles the natural human leg, removing the need for cosmetic covers and creating a sleek, functional appearance. Its spring-loaded wooden foot and ankle flexibility allow smoother, more natural walking movements. By integrating user-focused design and material innovation, Flexura offers better usability and confidence for daily wear.

MATERIALS AND METHODS

3D rendering of Floxel

Flexura uses titanium for the pylon, offering high strength and a lightweight

structure. The socket is 3D-printed with PLA for customizable fitting, while the carbon fiber leg cover adds durability and a modern aesthetic. Soft foam padding inside the socket absorbs shock and reduces pressure during walking. An adjustable strap and buckle system secures the socket, improving stability and preventing slippage.

The foot is crafted from wood, chosen for its natural durability and ability to integrate a spring mechanism that enhances energy return and supports natural gait. The design process involved sketch ideation, 3D modeling, and user testing, which guided the selection of materials and structural refinements.

RESULTS AND DISCUSSION/FINDINGS

Respondent feedback highlighted concerns about socket comfort, structural strength, and walking stability. These insights led to the inclusion of dual structural supports, additional padding, and the adjustable strap system. The wooden foot with a built-in spring provides smoother motion and improved energy efficiency, while the carbon fiber cover ensures durability without extra weight. Overall, Flexura balances ergonomic comfort, mechanical strength, and aesthetic appeal.

CONCLUSION & RECOMMENDATION

Flexura merges advanced materials, lightweight construction, and user-centered ergonomics to create a prosthetic leg that enhances comfort, stability, and mobility. The titanium pylon, 3D-printed PLA socket, carbon fiber cover, and spring-loaded wooden foot ensure durability, flexibility, and a modern appearance. Future improvements could include smart materials, adjustable modular ankle joints, or personalized socket systems to further enhance usability and performance. Flexura represents a significant step toward innovative and practical prosthetic solutions.

The picture of Environment (FEXURA)

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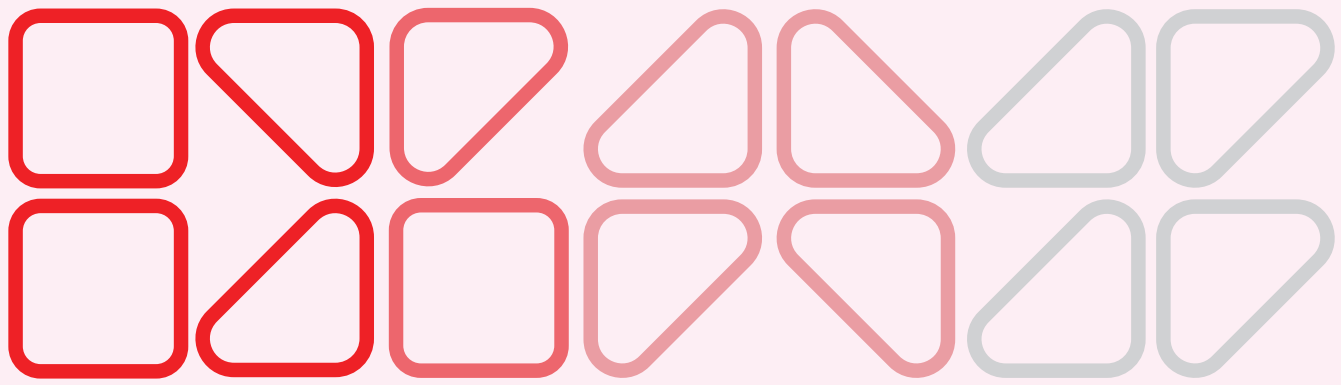

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