中華工程教育學會 認證委員會
工程教育認證規範（EAC2024）

中華民國 93 年 4 月 15 日　第一屆第二次認證委員會會議通過認證規範 1~認證規範 8
中華民國 95 年 12 月 18 日 第二屆第二次認證委員會會議通過認證規範 1~認證規範 9
中華民國 97 年 12 月 19 日 第三屆第四次認證委員會會議通過修訂
中華民國 98 年 6 月 12 日　第三屆第六次認證委員會會議通過修訂
中華民國 101 年 10 月 5 日 第五屆第四次認證委員會會議通過修訂
中華民國 102 年 3 月 18 日 第五屆第六次認證委員會會議通過修訂
中華民國 104 年 11 月 27 日第七屆第二次認證委員會會議通過修訂
中華民國 111 年 4 月 19 日 第十屆第二次認證委員會會議通過修訂

認證規範 1~8 適用於授予學士學位的學程；認證規範 G 適用於授予碩士或博士學位的學程

認證規範 1：教育目標

本規範評量教育目標：

1.1 須具備明確且公開的教育目標，展現學程的功能及特色，且符合時代潮流及社會需求。
1.2 須說明教育目標與學校願景或教育目標的關聯性及形成的流程。
1.3 須具備有效的評量方式以確保教育目標的達成。

認證規範 2：學生

本規範評量學生輔導成效：

2.1 須訂定並有效執行配合達成教育目標合理可行的規章。
2.2 須訂定並有效執行鼓勵學生交流與學習的措施及辦法。
2.3 須持續並有效執行學生輔導機制及成效評量。

認證規範 3：應屆畢業生核心能力

本規範評量學生在畢業時須具備下述核心能力：

3.1 運用數學、科學及工程知識的能力。
3.2 設計與執行實驗，以及分析與解釋數據的能力。
3.3 執行工程實務所需技術、技巧及使用現代工具的能力。
3.4 設計工程系統、元件或製程的能力。
3.5 專案管理、有效溝通、領域整合及團隊合作的能力。
3.6 發掘、分析、應用研究成果及兼顧永續發展，以解決複雜且整合性工程問題的能力。
3.7 認識時事議題，瞭解工程技術對環境永續、社會共好及全球發展的影響，並培養持續學習的習慣及能力。
3.8 理解及應用專業與資訊倫理，認知社會責任及尊重多元觀點。

認證規範 4：課程及教學

本規範評量課程及教學：

4.1 課程設計及內容須與教育目標一致，且能透過畢業生成績單分析，佐證畢業生修習的課程應至少包含數學及基礎科學、工程專業課程及通識課程等要素，其中：
　4.1.1 數學及基礎科學課程至少各 9 學分，且合計須占最低畢業學分的四分之一以上。
　4.1.2 工程專業課程須占最低畢業學分的八分之三以上，其中須包括整合工程設計能力的專題實作。
　4.1.3 通識課程與專業課程均衡，並與教育目標一致。
4.2 課程及教學須符合產業需求，並能反思及改善，以確保學生核心能力的培育。

認證規範 5：教師

本規範評量教師下列各項的執行情形：

5.1 應有足夠的專任教師人數。
5.2 教師須參與教育目標的訂定及執行。
5.3 教師的專長應能涵蓋其相關領域所需的專業知識。
5.4 教師與學生間的互動及輔導學生的成效。
5.5 教師與業界交流的執行成效。
5.6 教師專業持續成長的管道及鼓勵措施。
5.7 教師參與相關學術及專業組織以及其活動。

認證規範 6：設備及空間

本規範評量教學相關軟硬體設備、設施及空間：

6.1 須營造一個有利師生互動及學生發展專業能力的環境。
6.2 須提供足夠的專業設備與工具及資訊設施，以利學生學習。
6.3 須具備安全的學習空間、設備維護及管理制度。

認證規範 7：行政支援人力及經費

本規範評量行政支援人力及經費：

7.1 須提供足以確保學程品質及賡續發展的行政支援人力及經費，並具備有效的領導及管理制度。
7.2 須提供足以支援師生專業成長的經費。
7.3 須提供足夠的行政及技術人力。
7.4 須提供足夠的經費支應教學、實驗及實習設備的取得、保養及運轉。

認證規範 8：持續改善

本規範評量持續改善機制及成效：

8.1 須具備持續改善機制。
8.2 須說明持續改善成效。

認證規範 G：研究所認證基本要求

研究所教育為學士教育的延伸，且以「專、精」為教育重點。本規範界定研究所教育認證的考量要點：

G.0 須具有適當的入學評量方式。
G.1 符合規範 1 教育目標的要求。
G.2 具備規範 2 學生的要求，但須強調研究生與指導教授間的互動。
G.3 具備規範 3 的要求，及具有：
  G.3.1 特定領域的專業知識。
  G.3.2 策劃及執行專題研究的能力。
  G.3.3 撰寫專業論文的能力。
  G.3.4 創新思考及獨立解決問題的能力。
  G.3.5 與不同領域人員協調整合的能力。
  G.3.6 良好的國際觀。
  G.3.7 領導、管理及規劃的能力。
  G.3.8 終身自我學習成長的能力。
G.4 須提供適當的課程及教學，以滿足專業領域發展的需求。
G.5 具備規範 5 教師的要求，且教師須重視學術或實務研究、發表相關研究成果並參與國內外學術活動。

G.6 具備規範 6 設備及空間的要求，且須能滿足研究的需要。
G.7 具備規範 7 行政支援人力及經費的要求。
G.8 符合規範 8 持續改善的要求。

附註：IEET 工程教育認證（EAC）規範係依據下述 Washington Accord 的三項主軸要求而定：Range of Problem Identification and Solving、Knowledge and Attitude Profile、Graduate Attribute Profiles。Washington Accord 的要求多已含括於 EAC 規範中，下述文字供受認證學程參考。

Washington Accord Range of Problem Identification and Solving

Complex problems have characteristic WP1 and some or all of WP2 to WP7:

- **WP1.** Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamentals-based, first principles analytical approach
- **WP2.** Involve wide-ranging and/or conflicting technical, non-technical issues (such as ethical, sustainability, legal, political, economic, societal) and consideration of future requirements
- **WP3.** Have no obvious solution and require abstract thinking, creativity and originality in analysis to formulate suitable models
- **WP4.** Involve infrequently encountered issues or novel problems
- **WP5.** Address problems not encompassed by standards and codes of practice for professional engineering
- **WP6.** Involve collaboration across engineering disciplines, other fields, and/or diverse groups of stakeholders with widely varying needs
- **WP7.** Address high level problems with many components or sub-problems that may require a systems approach

Washington Accord Knowledge and Attitude Profile

A Washington Accord program provides:

- **WK1.** A systematic, theory-based understanding of the **natural sciences** applicable to the discipline and awareness of relevant **social sciences**
- **WK2.** Conceptually-based **mathematics**, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline
- **WK3.** A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline
- **WK4.** Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
- **WK5.** Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports **engineering design and operations** in a practice area
- **WK6.** Knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline

WK7.Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development*

WK8. Engagement with selected knowledge in the current **research literature** of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues

WK9.Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes

*Represented by the 17 UN Sustainable Development Goals (UN-SDG)

Washington Accord Graduate Attribute Profiles

Engineering Knowledge	**WA1**: Apply knowledge of mathematics, natural science, computing and engineering fundamentals, and an engineering specialization as specified in WK1 to WK4 respectively to develop solutions to complex engineering problems
Problem Analysis	**WA2**: Identify, formulate, research literature and analyze *complex* engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences with holistic considerations for sustainable development* (WK1 to WK4)
Design/ development of solutions	**WA3**: Design creative solutions for *complex* engineering problems and design systems, components or processes to meet identified needs with appropriate consideration for public health and safety, whole-life cost, net zero carbon as well as resource, cultural, societal, and environmental considerations as required (WK5)
Investigation	**WA4**: Conduct investigations of *complex* engineering problems using research methods including research-based knowledge, design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions (WK8)
Tool Usage	**WA5**: Create, select and apply, and recognize limitations of appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to *complex* engineering problems (WK2 and WK6)
The Engineer and the World	**WA6**: When solving complex engineering problems, analyze and evaluate sustainable development impacts* to: society, the economy, sustainability, health and safety, legal frameworks, and the environment (WK1, Wk5, and WK7)

Ethics	**WA7**: Apply ethical principles and commit to professional ethics and norms of engineering practice and adhere to relevant national and international laws. Demonstrate an understanding of the need for diversity and inclusion (WK9)
Individual and Collaborative Team work	**WA8**: Function effectively as an individual, and as a member or leader in diverse and inclusive teams and in multi-disciplinary, face-to-face, remote and distributed settings (WK9)
Communication	**WA9**: Communicate effectively and inclusively on *complex* engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, taking into account cultural, language, and learning differences.
Project Management and Finance	**WA10**: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
Lifelong learning	**WA11**: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8)

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