# http://www.ric.edu/webcommunications/images/SealWithText_Small_Black.pngUNDERGRADUATE CURRICULUM COMMITTEE (UCC)PROPOSAL FORM

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| A.1. [Course or program](#Proposal) | **CSCI 348** **Artificial Intelligence in Gaming** |  |
| A. 1b. Academic unit | **School of Business**  |  |
| A.2. [Proposal type](#type) | **Course: creation**  |  |
| A.3. [Originator](#Originator) | **Timothy Henry** | [Home department](#home_dept) | **Computer Science and Information Systems** |
| A.4. [Context and Rationale](#Rationale) Must include additional information listed in smart tip for all [new programs](#type). If **online** course or program, you need to explain what mode(s) you plan to use and why you need that specific delivery.  | The gaming industry has been at the forefront of AI innovation, driving advancements in AI character behavior, procedural content generation, and AI-assisted game design. Integrating AI in Gaming within an AI degree program exposes students to a broad range of AI techniques that can be used in a broad range of applications such as plotting the best route to a destination.The gaming industry places a strong emphasis on player engagement, user experience, and storytelling. Integrating AI into games is a creative and challenging endeavor. This course encourages students to explore the creative aspects of AI and how it can be used to enhance player experiences, fostering innovation in AI applications.Games often include complex ethical considerations related to AI-driven character behaviors, in-game economies, and player interactions. This course can address these ethical aspects, preparing students to make responsible decisions when implementing AI in gaming. |
| A.5. [Student impact](#student_impact)Must include to explain why this change is being made? | This course will be taken primarily by AI majors, but it can also serve as a very useful elective for CSCI, CIS and Cybersecurity majors. |
| A.6. [Impact on other programs](#impact)  | CSCI majors take the prerequisite CSCI 209 as part of their major so this course can be taken as an elective without additional coursework. CIS and Cybersecurity majors would need to take CSCI 209 before taking this course. |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty):  | Existing CSCI faculty and/or adjunct faculty will teach the courses. Depending on the growth of the new AI Program, additional faculty and adjuncts may be needed. |
| [*Library*:](#library) | None |
| *Technology (for in person delivery)* | None. Courses will use existing classrooms and/or computer labs (hence the cap at 25). |
| *Technology: (for online delivery. Must be RIC supported)* | None |
| [*Facilities*](#facilities): | None. Courses will use existing classrooms and/or computer labs. |
| A.8. [Semester effective](#Semester_effective) | **Fall 2024** | A.9. [Rationale if sooner than next Fall](#Semester_effective) | **N/A** |
| A.10. INSTRUCTIONS FOR CATALOG COPY: Use the Word copy versions of the catalog sections found on the UCC Forms and Information page. Cut and paste into a single file **ALL the relevant pages from the college catalog that need to be changed.** Use tracked changes feature to show how the catalog will be revised as you type in the revisions. If totally new copy, indicate where it should go in the catalog. If making related proposals a single catalog copy that includes all changes is preferred. Send catalog copy as a separate single Word file along with this form. |
| A.11. List here (with the relevant URLs), any RIC website pages that will need to be updated (to which your department does not have access) if this proposal is approved, with an explanation as to what needs to be revised: |
| A. 12 **Check to see if your proposal will impact any of our** [**transfer** **agreements,**](file:///Users/SAbbotson/Documents/Curriculum/ManualandWebsite/transfer%20agreements) **and if it does explain in what way. Please indicate clearly what will need to be updated, including any changes in prefix numbers/titles for TES.****N/A** |
| A. 13 Check the section that lists “Possible NECHE considerations” on the UCC Forms and Information page and if any apply, indicate what that might be here and contact Institutional Research for further guidance.**N/A** |

**C.** [**NEW OR REVISED COURSES**](#delete_if) **THAT ARE DESIGNATED AS HYBRID**

|  |   | New |
| --- | --- | --- |
| C.1. [Course prefix and number](#cours_title)  |  | **CSCI 348** |
| C.2. Cross listing number if any |  | **N/A** |
| C.3. [Course title](#title)  |  | **Artificial Intelligence in Gaming** |
| C.4. [Course description](#description)  |  | **Students explore artificial intelligence techniques and their applications in the gaming industry. Students gain hands-on experience with AI algorithms used for character behavior, procedural content generation, and game design.** |
| C.5. [Prerequisite(s)](#prereqs) |  | **CSCI 209 or consent of department chair** |
| C.6. [Offered](#Offered) please read the screen tips to do this correctly, alternate years needs to be assigned odd/even, and a specific semester. |  | **Fall** |
| C.7. [Contact hours](#contacthours)  |  | **4** |
| C.8. [Credit hours](#credits) |  | **4** |
| C.9. [Justify differences if any](#differences) | **N/A** |

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| C.10. [Grading system](#grading)  |  | **Letter grade** |
| C.11. a. [Type of cours](#instr_methods)e  |  | **Lecture | Laboratory**  |
| C.11.b Instruction mode with percentage |  | **Hybrid:****51% in-person****49% online** Course will be offered one day a week in-person along with an in-person final project |
| Reminder: Instructors are responsible for ensuring their course meets accessibility standards and provides accommodations identified by Disability Services (find links).  |
| C.11.c. For online components only: How will students engage with the content  |  |  **Lectures (recorded) | Course readings | Videos or other recordings | Practice and lab activities | Online discussions**  |
| C.11.d. How will students engage with other students  |  | **In-class discussions | Class activities | Online discussion boards | Team/group projects** |
| C.12. CATEGORIES 12. a. [How](#required) to be used |  | **Restricted elective for major/minor** |
|  12 b. Is this an Honors  course? |  | **NO** |
|  12. c. [General Education](#ge) N.B. Connections must include at least 50% Standard Classroom instruction. |  | **NO**  |
|  12. d. Writing in the  Discipline (WID) |  | **NO** |
| C.13. [How will student performance be evaluated?](#performance)  |  | **Exams | Class Work | Quizzes | Projects | Discussion board | Lecture/lab course** |
| C.14 [Recommended class-size](#class_size) |  | **25 (computer lab)** |
| C.15. [Redundancy statement](#competing) |  | **No** |
| C. 16. Other changes, if any | **N/A** |

| C.17**.** [**Course learning outcomes**](#outcomes) | [**Professional Org.Standard(s)**](#standards)**, if relevant** | [**How will each outcome be measured?**](#measured) |
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| Apply pathfinding algorithms (e.g., A\* and Dijkstra) to navigate game environments. |  | Homework, in-class assignments, quizzes, labs. |
| Create finite state machines and behavior trees to control in-game character behaviors. |  | Labs, projects and exams. |
| Implement machine learning algorithms for character adaptation and behavior learning in games. |  | Projects, in-class assignments, and labs |
| Analyze the role of rule-based AI systems in game design and how they contribute to game mechanics. |  | Homework, class discussions, and exams. |
| Evaluate the benefits and challenges of procedural content generation in game development. |  | Written homework assignments, quizzes and exams. |
| Compare and contrast different AI-driven character behaviors and their impact on player engagement. |  | Written homework assignments, projects, quizzes and exams. |

| C.18. [**Topical outline**](#outline)**:**  |
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| **Week 1: Introduction to AI in Gaming*** Understanding the role of AI in modern video games.
* Overview of AI techniques in character behavior, game world modeling, and content generation.
* Historical context and key milestones.

**Week 2: Game Design and AI*** The synergy between game design and AI.
* Player experience and AI-driven game mechanics.
* Balancing challenge and fun through AI.

**Week 3: Pathfinding and Navigation*** Pathfinding algorithms: A\* and Dijkstra.
* Navigation mesh generation.
* Real-time character movement and steering behaviors.

**Week 4: Decision-Making in Games*** Finite state machines (FSM) for character behavior.
* Behavior trees and hierarchical AI.
* Goal-oriented AI for non-player characters (NPCs).

**Week 5: Rule-Based Systems*** Creating rule-based AI systems.
* Designing and implementing game rules using logic.
* Combining rule-based and learning-based AI for complex behaviors.

**Week 6: Machine Learning in Gaming*** Introduction to machine learning in games.
* Supervised learning for game AI.
* Reinforcement learning for adaptive AI agents.

**Week 7: Game Character AI*** Building character personalities and traits.
* Adaptive AI for enemy behaviors.
* Dynamic response to player actions.

**Week 8: Procedural Content Generation*** The role of procedural content in game development.
* Generating levels, maps, and game content.
* Evolutionary algorithms and procedural generation techniques.

**Week 9: Game Testing and Debugging*** Testing AI behaviors and game mechanics.
* AI-driven stress testing.
* Debugging tools and techniques for game AI.

**Week 10: Multi-Agent Systems*** Managing multiple AI agents in a game world.
* Cooperative and competitive multi-agent behaviors.
* Emergent properties and complex systems.

**Week 11: Game AI and Player Experience*** Dynamic difficulty adjustment and player engagement.
* Player modeling and personalization.
* Adaptive narrative and storytelling using AI.

**Week 12: AI for Game Design Tools*** Using AI to automate content creation.
* Designing level editors and content generators.
* Tools for procedural storytelling.

**Week 13: AI in Game Development Platforms*** Game engines and AI integration.
* Unity ML-Agents and Unreal Engine AI tools.
* Creating AI-driven virtual environments.

**Week 14: Ethical Considerations and AI in Gaming*** Ethical challenges in AI-driven games.
* Fairness, inclusivity, and responsible AI.
* Industry best practices and guidelines.

**Week 15: Future Trends and Final Projects*** Emerging AI trends in gaming.
* Student presentations of final projects.
* Course review, key takeaways, and the future of AI in gaming.
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**G. Signatures**

* **Changes that affect General Education in any way MUST be approved by ALL Deans and COGE Chair**.
* Changes that directly impact more than one department/program MUST have the signatures of all relevant department chairs, program directors, and their relevant dean (e.g. when creating/revising a program using courses from other departments/programs). Check UCC manual 4.2 for further guidelines on whether the signatures need to be approval or acknowledgement.
* Proposals that do not have appropriate approval signatures will not be considered.
* Type in name of person signing and their position/affiliation.
* Send electronic files of this proposal and accompanying catalog copy to curriculum@ric.edu to the current Chair of UCC. Check UCC website for due dates. **Do NOT convert to a .pdf.**

##### G.1. Approvals: required from programs/departments/deans who originate the proposal. THESE may include multiple departments, e.g., for joint/interdisciplinary proposals.

| Name | Position/affiliation | [Signature](#_Signature" \o "Insert electronic signature, if available, in this column) | Date |
| --- | --- | --- | --- |
| Suzanne Mello-Stark | Chair of Computer Science and Information Systems | \*approved by email | 2/23/24 |
| Marianne Raimondo | Dean of School of Business | \*approved by email | 2/23/24 |

##### G.2. [Acknowledgements](#acknowledge): REQUIRED from OTHER PROGRAMS/DEPARTMENTS (and their relevant deans if not already included above) that are IMPACTED BY THE PROPOSAL. SIGNATURE DOES NOT INDICATE APPROVAL, ONLY AWARENESS THAT THE PROPOSAL IS BEING SUBMITTED. CONCERNS SHOULD BE BROUGHT TO THE UCC COMMITTEE MEETING FOR DISCUSSION; all faculty are welcome to attend.

| Name | Position/affiliation | [Signature](#Signature_2) | Date |
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