

Practicum in STEM – Robotics Emphasis YAG

Two Credits | Robotics Capstone | Full Year | 36 Weeks (4 Grading Periods) | Recommended Grade 12

Course Information: Prerequisites: Algebra I and Geometry. Recommended prerequisites: two STEM Career Cluster credits. PSTEM = \$127.759 Practicum in Science, Technology, Engineering, and Mathematics. This paid or unpaid capstone provides supervised practical application of previously studied STEM knowledge and skills. The YAG emphasizes advanced robotics and automation through engineering design, programming, sensors, feedback systems, mechanisms, fabrication, troubleshooting, testing, project management, technical research, leadership, professional communication, work-based learning, and portfolio development. ACCESS may support postsecondary planning, credentials, career preparation, résumé development, and portfolio completion.

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated TEKS	Extension Activities
1	1–2	Unit 1 – Practicum Launch, Professional Standards & Robotics Career Goals	- Establish practicum expectations, individual occupational objectives and advanced robotics skill goals - Demonstrate professional appearance/conduct, punctuality, reliability, responsibility and adherence to policies - Apply ethical reasoning, quality standards and practicum safety requirements - Assess prior robotics competencies and identify technical strengths/areas for growth - Begin/update professional résumé and portfolio structure	- PSTEM1(A–H) - PSTEM5(A–B) - PSTEM6(A)	- ACCESS: robotics career/postsecondary planning - Initial skills audit - Practicum goal plan
1	3–5	Unit 2 – Leadership, Team Operations & Engineering Communication	- Analyze leadership through trust, attitude, integrity and responsibility - Apply team building, consensus, continuous improvement, cooperation, adaptability and conflict resolution - Practice negotiation and respectful collaboration across diverse teams - Use technical vocabulary, active listening, verbal/nonverbal cues and clear written/oral communication - Lead and document robotics design-team meetings	- PSTEM1(B–E) - PSTEM3(A–F) - PSTEM4(A–G)	- Team leadership rotation - Technical briefing - Design-team meeting record
1	6–9	Unit 3 – Technical Research, Problem Definition & Robotics Design Proposal	- Identify an authentic robotics/automation problem connected to a user, industry or community need - Analyze problem elements and relevant technical information - Evaluate source reliability and conduct technical research for decision making - Compare alternative solutions using critical-thinking/problem-solving strategies - Develop a robotics capstone proposal with criteria, constraints, research, timeline and deliverables	- PSTEM2(A–D) - PSTEM4(A, C–D, G) - PSTEM5(A)	- Industry problem research - Design proposal - Mentor/client feedback
2	10–12	Unit 4 – Advanced Robotics Technical Skill Development	- Develop advanced skills based on the selected occupational objective - Integrate mechanical systems, motors, gears, manipulators/end effectors and precision measurement - Integrate sensors, feedback control and autonomous system behavior - Advance programming through modular code, algorithms, sensor variables and control logic - Evaluate technical proficiency and document evidence of growth	- PSTEM2(A–D) - PSTEM5(A–B) - PSTEM6(A)	- Advanced robotics labs - Skill micro-credentials where available - Technical skills evidence
2	13–15	Unit 5 – Prototype Development, Fabrication & System Integration	- Translate the capstone proposal into subsystem requirements and a production plan - Fabricate/assemble robotic components using appropriate tools, materials and safe procedures - Integrate mechanical, electrical, sensing and programmed-control subsystems - Apply time management, quality standards and team responsibilities during production - Document work through engineering notebook entries, photos, code, schematics and work samples	- PSTEM1(B–H) - PSTEM3(B–E) - PSTEM5(A) - PSTEM6(A)	- Prototype fabrication - Subsystem integration review - Work sample collection

2	16–17	Unit 6 – Testing, Troubleshooting, Iteration & Semester Design Review	• Develop measurable testing protocols for robotic performance • Collect/analyze test data and identify system deficiencies • Troubleshoot mechanical, electrical, sensor and programming issues • Compare alternatives and implement evidence-based design improvements • Deliver a formal semester design review and evaluate technical strengths/weaknesses	• PSTEM2(A–D) • PSTEM4(A–G) • PSTEM5(A–B)	• Formal test report • Design review • Supervisor/mentor feedback
2	18	Semester 1 Exam – Practicum in STEM: Robotics	• Cumulative written/performance assessment • Professional standards, leadership, research, communication and technical application • Semester capstone evidence and portfolio review	• Cumulative: PSTEM1–6	• Targeted review/remediation
3	19–21	Unit 7 – Advanced Autonomous Systems & Intelligent Robotics	• Extend the capstone with advanced autonomous behaviors appropriate to the occupational objective • Use sensor data, feedback, algorithms and programmed decision making to improve system performance • Conduct technical research on emerging robotics/automation technologies • Compare technological alternatives and justify system architecture decisions • Communicate technical findings to peers, mentors or stakeholders	• PSTEM2(A–D) • PSTEM4(A–G) • PSTEM5(A–B)	• Autonomous systems challenge • Emerging technology research • Technical seminar
3	22–24	Unit 8 – Reliability, Quality, Safety & Technical Optimization	• Evaluate robotic system reliability, precision, efficiency and quality • Apply workplace safety requirements consistently during testing and maintenance • Use root-cause analysis and structured problem solving to diagnose failures • Optimize design, code and mechanical/electrical systems using test evidence • Document changes and evaluate growth in technical proficiency	• PSTEM1(F–H) • PSTEM2(A–C) • PSTEM5(A–B) • PSTEM6(A)	• Reliability study • Failure/root-cause analysis • Optimization report
3	25–27	Unit 9 – Robotics Project Leadership & Work-Based Application	• Operate the capstone as a professional engineering project with shared and individual responsibilities • Lead team tasks, negotiate decisions and resolve conflict • Apply practicum knowledge in laboratory, workplace, competition, community or client-based settings as available • Present progress, data and observations through formal/informal communication • Collect supervisor/mentor feedback and representative work samples	• PSTEM1(A–H) • PSTEM3(A–F) • PSTEM4(A–G) • PSTEM6(A)	• Industry/mentor engagement • Work-based application • Leadership reflection
4	28–30	Unit 10 – Capstone Validation & Stakeholder Testing	• Conduct full-system validation against capstone criteria and constraints • Gather user/stakeholder feedback and analyze system performance data • Compare current performance with alternatives and prior iterations • Research and implement final technical improvements • Prepare professional documentation explaining methods, results and decisions	• PSTEM2(A–D) • PSTEM4(A–G) • PSTEM5(A–B)	• Stakeholder testing • Validation report • Final design review
4	31–33	Unit 11 – Robotics Career Readiness, Credentials & Professional Portfolio	• Update portfolio with technical competencies, credentials/licensure preparation, recognitions and extended learning • Complete résumé, practicum abstract and representative robotics work samples • Incorporate supervisor evaluation and evidence of technical growth • Evaluate strengths/weaknesses and establish next-step education/career goals • Use ACCESS to support postsecondary, scholarship, credential and career planning	• PSTEM1(A–G) • PSTEM5(B) • PSTEM6(A)	• ACCESS: transition planning • Résumé/portfolio review • Credential research/preparation
4	34–35	Unit 12 – Final Robotics Capstone & Professional Portfolio Presentation	• Finalize the robotics/automation solution and all technical documentation • Prepare a professional presentation for interested stakeholders • Explain the problem, research, design decisions, technical skills, testing, failures, iterations and final performance • Present the professional portfolio including required practicum evidence • Reflect on leadership, teamwork, communication, ethics, safety & occupational readiness	• PSTEM1–6 • PSTEM6(B)	• Capstone defense • Portfolio presentation • Industry/community jury
4	36	Semester 2 Exam & Robotics Capstone Showcase	• Cumulative written/performance assessment • Advanced technical robotics application and problem solving • Final capstone, professional portfolio and stakeholder showcase	• Cumulative: PSTEM1–6	• Robotics capstone showcase

Practicum in STEM – Robotics Emphasis TEKS Coverage Checklist

Coverage verification: All six Practicum in STEM strands and every student expectation are intentionally addressed. Robotics and automation provide the occupational context for developing and demonstrating the required advanced STEM technical knowledge and skills.

Strand	Student Expectations	YAG Placement	Coverage
PSTEM1	A–H	Units 1–2, 5, 8–9, 11–12	100%
PSTEM2	A–D	Units 3–4, 6–8, 10, 12	100%
PSTEM3	A–F	Units 2, 5, 9, 12	100%
PSTEM4	A–G	Units 2–4, 6–7, 9–10, 12	100%
PSTEM5	A–B	Units 1, 3–4, 6–8, 10–12	100%
PSTEM6	A(i–viii), B	Units 1, 4–5, 8–9, 11–12	100%

Implementation Notes

- Practicum in STEM is a two-credit paid or unpaid capstone recommended for Grade 12. Prerequisites are Algebra I and Geometry; two STEM Career Cluster credits are recommended prerequisites.
- The robotics emphasis should provide supervised practical application of advanced technical skills developed through the student's prior robotics/STEM coursework. Practicum experiences may occur in laboratory, school-based enterprise, competition, community, client, mentorship, or workplace settings appropriate to the experience.
- The capstone should emphasize authentic robotics and automation work: mechanical/electrical integration, sensors and feedback, programming, autonomous systems, troubleshooting, fabrication, testing, quality, safety, technical research, project management, and iterative improvement.
- Each student should maintain a professional portfolio containing technical competencies, relevant credential information, recognitions/awards/scholarships, extended learning experiences, a practicum abstract, résumé, representative work samples, and supervisor evaluation, followed by presentation to interested stakeholders.
- Weeks 18 and 36 are reserved for cumulative semester exams. No instructional unit crosses the semester boundary, and no calendar-specific dates are included.