ROBOTICS ENGINEERING

Programming & Control Systems with REV Robotics

COURSE INFORMATION	INSTRUCTOR
Grade Level: 9th - 12th	**Michael Puckett, M.Ed.**
Credits: 1.0 CTE/Elective	michael@trceducation.com
Duration: 32 weeks (Full Year)	615-796-4632
Schedule: TBD	TennesseeRoboticsCenter.com
Prerequisites: Algebra I (C+ or better)	

SMART CREDENTIALS: Software Foundations + Robotics Integration (2 certifications)

CLASS STRUCTURE (2.5 Hours)

INSTRUCTION	SNACK/DEVOTION	HANDS-ON LAB
4:30 - 5:30 PM	5:30 - 6:00 PM	6:00 - 7:00 PM
60 minutes	30 minutes	60 minutes

Students may bring a peanut-free snack. The devotion time focuses on character development and the 'Dare Mighty Things' mission mindset.

COURSE DESCRIPTION

A hands-on course teaching students to program and control robotic systems using the REV Robotics platform—the same hardware used in FIRST Tech Challenge competitions worldwide. Students learn Java programming, sensor integration, motor control, and autonomous navigation while building competition-ready robots. By year's end, students will have programmed a complete robot with autonomous and driver-controlled modes.

REQUIRED TEXTBOOK

Learn Java for FTC

Alan G. Smith (free PDF available, or paperback ~$15)

ISBN: 979-8644009886

TIME COMMITMENT

In-class instruction and lab time	2.5 hours/week
Textbook reading & tutorials	1-2 hours/week
Coding practice & project work	2-3 hours/week
TOTAL WEEKLY COMMITMENT	**6-8 hours/week**

COURSE UNITS (32 Weeks)

Unit	Topic	Weeks
1	**Introduction to REV & Control Systems** Hardware overview, Control Hub, wiring, configuration, Android Studio	1-4
2	**Java Fundamentals ★ SMART** Variables, operators, methods, classes, OpModes, control flow	5-8
3	**Motors & Motion ★ SMART** DC motor control, encoders, drivetrain programming, PID basics	9-12
4	**Sensors & Feedback ★ SMART** Touch, distance, color sensors, conditional logic, sensor fusion	13-16
5	**Autonomous Programming ★ SMART** Sequencing, state machines, encoder navigation, timing, path planning	17-20

6	**TeleOp & Driver Control ★ SMART** Gamepad input, tank/arcade drive, servo control, button mapping	21-24
7	**Systems Integration ★ SMART** Subsystem architecture, code organization, debugging, testing	25-28
8	**Capstone: Competition Robot** Full robot programming, simulation, match strategy, presentation	29-32

★ SMART = Unit aligned to CMU SMART certification competencies

GRADING

Reading Quizzes	10%
Weekly Coding Challenges	20%
Unit Projects	30%
Skills Assessments	15%
Capstone Project	25%

Grading Scale:

A: 90-100% | B: 80-89% | C: 70-79% | D: 60-69% | F: Below 60%

REQUIRED MATERIALS

- *Learn Java for FTC* textbook (free PDF or paperback)
- Laptop with Android Studio installed
- GitHub account (free)
- Engineering notebook for design documentation
- Closed-toe shoes required every class

PATHWAY

CS Foundations / Engineering I → **Robotics Engineering** → FTC Competition / College CS & Engineering

Robotics Engineering provides hands-on programming experience with industry-standard hardware. Students completing this course are prepared for FIRST Tech Challenge competition teams, AP Computer Science, college-level programming, or robotics careers. The Java foundation transfers directly to college CS coursework.