



GREAT NECK PUBLIC SCHOOLS

"Where Discovery Leads to Greatness"

#DiscoverGreatness

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Curriculum Profile: Robotics

<u>Department</u>	Technology Education	
<u>Course Name</u>	Robotics Advanced	
<u>Course Length</u>	Full year	
<u>High School Credits</u>	1 Unit of Credit	
<u>Description</u>	This class is available to students who have completed the Robotics class and will provide a further in-depth study in the field of Robotics. Students will focus on many design, model building, troubleshooting, electronic, and physics based concepts. It will provide not only specific building and running of the robot through computer programs, but also gives students firsthand knowledge of how an engineer-based organization is run. This full-year class is open to 12th grade students, and can be used to satisfy the third year of Science requirement. This course is run in conjunction with Farmingdale State College (SUNY). If students have not earned college credit through "Robotics", they can earn 3 college credits for the successful completion of this course.	
<u>Target/eligible students</u>	11-12	
<u>State Learning Standards Link(s)</u>	https://www.nysed.gov/career-technical-education/technology-education-learning-standards	
<u>Primary texts and materials</u>	Industrial Robotics Fundamentals-Theory and Applications, Larry T. Ross, Stephen W. Fardo and Michael F. Walach	
<u>Scope/Sequence</u>		
<u>Week 1</u>	INTRODUCTION TO CLASS PERTINENT HANDOUTS INTRODUCTION TO SAFETY: GENERAL, TOOL, ETC. SAFETY LESSONS SAFETY MULTI-MEDIA	
<u>Week 2</u>	SAFETY REVIEW SAFETY TEST INTRODUCTION TO SHOP/WORK AREA TOOL ROOM LESSON CLEAN-UP ASSIGNMENTS	
<u>Week 3</u>	HISTORY OF ROBOTICS ORIGIN OF ROBOTICS NAME ROBOTIC APPLICATIONS IN SOCIETY DEMONSTRATIONS	
<u>Week 4</u>	WHAT IS A ROBOT? ROBOTIC FUNDAMENTALS PARTS OF THE ROBOT ROBOT VOCABULARY DEMONSTRATIONS	

<u>Week 5</u>	OVERVIEW OF WEEKS 3 AND 4 QUIZ SIMPLE MACHINES LEVER SYSTEMS INCLINE PLANES WHEEL AND AXLES SCREW SYSTEMS WEDGE SYSTEMS PULLEY SYSTEMS
<u>Week 6</u>	PNEUMATIC SYSTEMS HOSES, VALVES AND MANIFOLDS PRESSURE GAUGES AIR STORAGE TANKS DEMONSTRATIONS
<u>Week 7</u>	HYDRAULIC SYSTEMS ADDITIONAL FLUID POWER SYSTEMS PISTONS FANS AND COOLING SYSTEMS DEMONSTRATIONS
<u>Week 8</u>	OVERVIEW OF WEEKS 5,6,7 - QUIZ ELECTRICAL SYSTEMS ELECTRICAL TERMS FUSES AND FUSE PANELS SOLDER LESSON WIRING AND SOLDERLESS CONNECTORS DEMONSTRATIONS
<u>Week 9</u>	USE OF SENSORS AND SWITCHES IN ROBOTIC APPLICATIONS SOLENOIDS POWER SUPPLIES AND POWER SOURCES BATTERIES ALTERNATIVE FUELS DEMONSTRATIONS
<u>Week 10</u>	STEERING SYTEMS COMPONENTS OF STEERING RACK AND PINION DEMONSTRATIONS
<u>Week 11</u>	BRAKING SYSTEMS AIR POWERED FLUID POWERED MECHANICAL BRAKING APPLICATIONS DEMONSTRATIONS
<u>Week 12</u>	OVERVIEW OF WEEKS 8,9,10,11 - QUIZ TYPES OF TIRES TREAD VARIATIONS SIZE TO PERFORMANCE RATIOS DEMONSTRATIONS
<u>Week 13</u>	DRIVETRAIN LESSONS

	PURPOSE OF DRIVETRAIN COMPONENTS OF DRIVETRAIN: GEARS, TRANSMISSION, DRIVESHAFT, CLUTCHES FRONT-WHEEL DRIVE VEHICLES REAR-WHEEL DRIVE VEHICLES FOUR-WHEEL DRIVE VEHICLES ALL-WHEEL DRIVE VEHICLES DEMONSTRATIONS
<u>Week 14</u>	MATERIAL IDENTIFICATION MATERIAL PROPERTIES AND CORRECT APPLICATION OF SUCH MANUFACTURING PROCESSING AND TECHNIQUES PAINTING AND FINISHING TECHNIQUES
<u>Week 15</u>	OVERVIEW OF WEEKS 12,13,14 QUIZ PROJECT MANAGEMENT TIME AND RESOURCE MANAGEMENT TEAMING APPLICATIONS ALLOCATION SYSTEMS PROJECT PRESENTATION SKILLS
<u>Week 16</u>	MID-TERM EXAM REVIEW AND TEST HAND OUT REVIEW PACKET MID-TERM EXAM MID-TERM EXAM MAKE-UPS DESIGN AND DEVELOPMENT OF SHIPPING CONTAINER FOR ROBOT INCORPORATE WORK AREA INTO CONTAINER
<u>Week 17</u>	FIRST ROBOTICS COMPETITION KICK-OFF GATHER INFORMATION FOR COMPETITION PLANNING AND DESIGN OF ROBOT FOR COMPETITION
<u>Week 18</u>	DEVELOPMENT OF PROTOTYPE LAB WORK ON ROBOT INITIAL DESIGN STAGES
<u>Week 19</u>	LAB WORK ON ROBOT FOR FIRST COMPETITION BUILDING OF FRAMEWORK
<u>Week 20</u>	LAB WORK ON ROBOT FOR FIRST COMPETITION INCORPORATING VARIOUS SYSTEMS ONTO ROBOT FRAMEWORK
<u>Week 21</u>	LAB WORK ON ROBOT FOR FIRST COMPETITION ATTACHING ELECTRONIC SYSTEMS ONTO ROBOT
<u>Week 22</u>	LAB WORK ON ROBOT FOR FIRST COMPETITION FINAL PROGRAMMING AND SCRIMMAGING
<u>Week 23</u>	LAB WORK ON ROBOT FOR FIRST COMPETITION PACKAGING ROBOT FOR TRANSPORTATION
<u>Week 24</u>	STRATEGIZING FOR LOCAL COMPETITION PRACTICING PRESENTATION TECHNIQUES FINALIZE TEAM STRUCTURE
<u>Week 25</u>	LOCAL ROBOTIC COMPETITION- LONG ISLAND REGIONAL

	FINAL PREPARATIONS AND STRATEGY
<u>Week 26</u>	COMPETITION CRITIQUE
<u>Week 27</u>	RECEIVE ROBOT BACK AT SCHOOL UNPACKAGE ROBOT AND BREAKDOWN TRAVELING TOOLROOM RE-TESTING AND TROUBLESHOOTING ROBOT PHYSICAL REVIEW OF COMPETITION USING ROBOT
<u>Week 28</u>	INTRODUCTION OF SCHOOL DEVELOPED COMPETITION OUTLINE OF PARAMETERS AND RESOURCES BRAINSTORMING
<u>Week 29</u>	PROTOTYPE DEVELOPMENT BEGIN MANUFACTURING PROCESS
<u>Week 30</u>	CONTINUE MANUFACTURING OF ROBOTS DESIGN AND MANUFACTURE PLAYING FIELD
<u>Week 31</u>	COMPLETE MANUFACTURING OF ROBOTS COMPLETE MANUFACTURING OF PLAYING FIELD
<u>Week32</u>	TESTING OF FINISHED PRODUCTS STRATEGIZING FOR COMPETITION ROBOTICS COMPETITION
<u>Week 33</u>	CONTINUE COMPETITION COMPETITION CRITIQUE DISASSEMBLE PLAYING FIELD BREAKDOWN AND STORE PARTS ACCORDINGLY FOR ALL ROBOTS
<u>Week 34</u>	ROBOTS IN THE MEDIA MOVIES AND TELEVISION BOOKS AND AUTHORS- JULES VERNE, ISAAC ASIMOV, GEORGE ORWELL WATCH ASSORTED MEDIA CLIPS
<u>Week 35</u>	MEDICAL APPLICATIONS OF ROBOTICS MILITARY ASPECTS OF ROBOTICS ARTIFICIAL INTELLIGENCE SPACE EXPLORATION NASA AND ROBOT PROBES
<u>Week 36</u>	FUTURE OF ROBOTICS ETHICAL ISSUES VIDEO "I-ROBOT"
<u>Week 37</u>	FINAL EXAM REVIEW AND TEST HAND OUT REVIEW PACKET FINAL EXAM FINAL EXAM MAKE-UPS
<u>Week38</u>	SHOP CLEAN UP INVENTORY MATERIALS TOOL ROOM CLEAN-UP

Additional Notes	3 Credits (SUNY Farmingdale) If not taken already in Robotics in a prior academic year
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