

# **Bedford Express University**

Goal – Create 45 minute classes to teach team members skills needed throughout the season.

Descriptions of what we are looking for are below. Classes that need additional 45 minute sessions will be given a second session such as Motors & Gears I, Motors & Gears II.

## **Mechanical Courses:**

**Motors & Gears 101**– Different motors can handle different jobs. Team members learn to select the right motor for the job by examining motor curves and gearing/gearboxes commonly used in FRC competition.

**Motors & Gears 201**– (Pre-Requisite: Motors & Gears 101) Team members learn advanced build practices.

**Robot Design 101** – Team members will learn the typical parts of a robot chassis including gearbox types. There are 4-6 common drive systems used in FRC competition. Students will review the chassis types, costs, and accessories available through AndyMark to get a good idea of what can be ordered “off the shelf” for their robot chassis.

**Robot Design 201** – Team members will learn advanced design practices.

**Hand Tool Training 101**– The proper safe use of hand tools such as drills, saws, wrenches and screw drivers will be taught. DON'T DRILL OVER THE ELECTRONICS!

**Field Build 101** – Students will look at the field build for the 2011 season and learn what is involved with our field build. Basic carpentry skills will be reviewed.

**Manipulators 101** – Students will learn about manipulators that have been used in past games and investigate their advantages and disadvantages.

## **Electrical Courses:**

**Control System 101** – Students will be introduced to the FRC 2011 control system. Students should be able to identify and describe the function of the cRio, breakout modules, motor controllers as well as turn the robot on and off. Students should also be able to “put together” the 2011 drive station and get the Poskarbinator from the “stored” state to the “up and running” state.

**Wiring 101** – The 2011 FRC wiring diagram will be introduced as a go-to guide for wiring the robot. Topics include wire gauges, wire types (power & PWM), end crimping and wire labeling.

**Sensors & Signals 101** – Control system or control system experience is a prerequisite. Students will learn about sensors commonly used on FRC robots including limit switches and potentiometers. Students will be introduced to the DAQ and the DAQ method of looking at sensor values.

## **Culture Changing Courses:**

**Award Submission 101** – Students will learn the requirements for Chairman’s Award and all FIRST awards. Students will learn strategies to help write solid award essays and to build solid presentations.

**Outreach 101** – Students will learn about the importance of community service. Students will brainstorm and develop community service opportunities in our community.

**Mentoring 101** – Students will learn how to spread the word of F.I.R.S.T. Students will develop strategies for growing our program and the whole robotics program for Bedford Public Schools. Students will learn about mentoring lower level FIRST programs and other FRC teams. This class is required for any team members mentoring another team.

**Mentoring 201** – (Pre-Requisite: Mentoring 101 &/or previous coaching experience) Students will advance their mentoring skills. Students will incorporate FIRST Core Values into their mentoring practices. Students will prepare to lead a team.

## **Design Courses:**

**CAD 101**– Students will be introduced to CAD and shown how to create basic shapes as well as representations of the 2011 robot size constraints. Illustrating the size of Ringgo and the size of field elements such as game pieces or tunnels and comparing that to the size constraints for the robot will be a very useful tool for the season.

**CAD 201** – Students will expand their knowledge in CAD design and will work on mapping out last year’s “Poskarbinator” in CAD for practice.

**Animation 101** – Students will learn how to make 3d animations using AutoDesk software. Students will review the rules for the animation award.

## **Communications Courses:**

**Website 101**– Students will learn to create and maintain our team and district websites. Students will learn basic website creation and minimal html. Students will learn what information is important on the website and how to get it there. Ethics and copy write will also be discussed.

**Publications 101** – Students will write sample stories/updates for use in the newsletter and or website. This class is about how to generate content, what point of view to use and how to avoid common writing pitfalls.

**Spirit 101** – Students will create ideas for our posters and banners. Students will create designs to include on our sponsor recognition banner. Students will learn about what makes a poster/banner eye-catching and informative.

**Spirit 102** – Students will learn and practice traditional first songs and dances.

**Spirit 103** – Students will learn how to make buttons and will create button ideas for the new season. Students will learn how to incorporate their artwork on the computer or through drawings into a button design. Students will become familiar with the software used to create our buttons.

**Public Speaking 101** – Students will learn how to look, act and speak in front of a crowd. Students will practice speaking in front of each other and will develop a business presentation for potential sponsors. This class is required for any students that wish to participate in a business presentation.

**Public Speaking 201** – (Pre-Requisite: Public Speaking 101 &/or past speaking experience approved by coaches) – Students will work on persuasive skills and advanced public speaking. This class is required for anyone that wishes to participate in the Chairman’s presentation &/or give a public speech on behalf of the team.

**Photography 101** – Students will learn about the fundamentals of photography, what shots best represent our team, what we want to record and how to share photographs to a central location.

**Scrapbooking 101** – Students will learn about the fundamentals of scrapbooking, what shots to choose to represent our team, what we want to record and how to document our season.

## **Safety Courses:**

**First Aid 101**–Students will become knowledgeable about what to do in a situation where first aid is needed including administering first aid as well as BX’s procedures and policies for getting help, separating bystanders from helpers and administering medications/treatments.

**Safety 101** – Students will learn about safe practices, the MSDS “rulebook” and the proper handling of accidents and spills.

## **Business Courses:**

**Finances 101** –(Pre-Requisite: 1 year team experience) Students will learn about creating a budget and managing the finances of the team. Students will help create a budget plan for this season.

**Rules Management** – Students will learn to read for detail, highlight key rulings and utilize online resources to keep current on rules and rule changes that happen throughout competition season.

**Strategy 101** – Students will learn the importance of strategy in our build and design process and at our competitions. Students will research strategy frameworks and discuss what is necessary to create our own scouting and strategy program.

**Leadership 101** – (Pre-Requisite: 1 year team experience or Freshman rep) – Students will learn key practices for being a leader.

### **Competition Courses:**

**Pit Crew Fundamentals 101** – (Pre-Requisite: 1 year team experience) Students will learn about the commitment involved in being on the pit crew. They will learn management and organization of the pit and the team during competitions. They will review key practices and discuss the workings of the pit. This course is mandatory for anyone wishing to be on the pit crew.

**Drive Team Fundamentals 101** –(Pre-Requisite: 1 year team experience AND availability to attend all competitions and competition practices – no exceptions) Students will learn about the commitment involved in being on the drive team. Students will learn basic drive team fundamentals. Students will learn how interact with other teams, other coaches and the robot. This course is mandatory for anyone wishing to be on drive team.

1. Mechanical
  - a. Motors & Gears I
  - b. Motors & Gears II
  - c. Robot Design I
  - d. Robot Design II
  - e. Hand Tool Training
  - f. Field Build
  - g. Manipulators
2. Electrical
  - a. Control System
  - b. Wiring
  - c. Sensors & Signals
3. Culture Changing
  - a. Awards Submission
  - b. Outreach
  - c. Mentoring I
  - d. Mentoring II
4. Design
  - a. CAD I
  - b. CAD II
  - c. Animation
5. Communications
  - a. Website
  - b. Publications
  - c. Spirit 1 – Signs and Banners
  - d. Spirit 2 – Songs and Dances
  - e. Spirit 3 – Buttons
  - f. Public Speaking I
  - g. Public Speaking II
  - h. Photography
  - i. Scrapbooking
6. Safety
  - a. First Aid & First Aid Policies/Procedures
  - b. Safety
7. Business
  - a. Finances/Budget

- b. Rules Management
  - c. Strategy
  - d. Leadership
- 8. Competition
  - a. Pit Crew Fundamentals
  - b. Drive Team Fundamentals

Varsity Requirements:

Jr. Varsity Requirements:

# BX University Registration:

Name: \_\_\_\_\_ Varsity Junior Varsity Casual

1= I really want to take this!      2= This sounds interesting!      3 = This could be interesting!

X=I do not want to take this!      V= Need for Varsity Credit      JV=Need for JV Credit

T = Teaching      TA = Teacher's Assistant

## Mechanical Courses:

Motors & Gears 101

Motors & Gears 201 -

Robot Design 101 -

Robot Design 201 -

Hand Tool Training 101 -

Field Build 101 -

Manipulators 101 -

## Electrical Courses:

Control System 101 -

Wiring 101 -

Sensors & Signals 101 -

## Culture Changing Courses:

Award Submission 101 -

Outreach 101 -

Mentoring 101 -

Mentoring 201 -

## Design Courses:

CAD 101 -

CAD 201 -

Animation 101 -

## Communications Courses:

Website 101 -

Publications 101 -

Spirit 101 -

Spirit 102 -

Spirit 103 -

Public Speaking 101 -

Public Speaking 201 -

Photography 101 -

Scrapbooking 101 -

## Safety Courses:

First Aid 101 -

Safety 101 -

## Business Courses:

Finances 101 -

Rules Management -

Strategy 101 -

Leadership 101 -

## Competition Courses:

Pit Crew Fundamentals 101 -

Drive Team Fundamentals 101 -