



Scientific Research & Design 1A (SCIRD 1A) Syllabus

Course Name

SCIRD 1A

Scientific Research & Design – Semester A

Course Information

SCIRD 1A is the first semester of this two-semester course.

Each day, we are surrounded by technology and engineering projects. From our phones to the bridges we drive over, engineering and technology influence many parts of our lives. In this course, you will learn more about engineering and technology careers and what skills and knowledge you'll need to succeed in these fields. You'll explore innovative and cutting-edge projects that are changing the world we live in and examine the design and prototype development process. This course will also help you understand the emerging issues in this exciting career field.

Course Delivery Method

Online

Contacting Your Instructor

You may contact your instructor through the Blackboard messaging system. Technical support is available 24/7 at www.k12.ttu.edu.

Course Objectives

After completing this course, you should be able to:

1. distinguish the differences between science, technology, and engineering;
2. identify the various technological ages and the rate of current development;
3. discuss open and closed systems;
4. find technological solutions through problem solving;

5. describe the fundamental processes needed for a project, including design and prototype development;
6. assess risks and benefits of a design solution;
7. describe applications of process control and automation systems;
8. apply design concepts and identify fields related to process control and automation systems while identifying emerging issues;
9. identify the underlying principles of bioengineering;
10. understand career opportunities, related fields, and emerging trends in biotechnology;
11. define impossible engineering; and
12. conduct and present research on emerging and innovative technology.

Scientific Research & Design addresses the required Texas Essential Knowledge and Skills (TEKS). These can be found at the [Texas Education Agency](http://www.tea.state.tx.us/teks/) website.

Textbook and Materials

There is no required text or special materials to purchase for this course.

Technical Requirements

- Internet access – preferably high speed (for accessing Blackboard)
- Email
- Word processing software such as Microsoft Word
- Presentation software such as Microsoft PowerPoint
- Adobe Reader (download from [Adobe.com](http://adobe.com))
- Audio and video capabilities (for watching/listening to course content)
- PDF app (free options available)

Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers
- creating PDFs (see **Requirements for Creating PDFs** in the Syllabus section of your course)

Course Organization

This course consists of eight units and a final examination. Each unit contains the following:

- Introduction and Instructions
- Learning Objectives and Curriculum Standards

- Learning Activities
- Assignments

Each unit includes several activities that present content knowledge. Each unit also includes multiple graded assignments to ensure that you learn the content that has been presented in the activities. Some of the assignments are automatically-graded quizzes, and some are written assignments or activities that your instructor will grade. Be sure you read all instructions carefully and ask your instructor for help if something is not clear.

Course Outline

Please note that some assignments will be hidden from you when you start the course. As you move through the lessons and complete assignments, more will unlock for you.

Unit	Topic	Approximate Time for Completion
Unit 1	Development and Understanding of Engineering	Two weeks
Unit 2	Making Problems into Ideas	Two weeks
Unit 3	From Sketches to Products	Two weeks
Unit 4	Civil Engineering	Two weeks
Midterm Exam	Units 1-4	
Unit 5	Mechanical Engineering	Two weeks
Unit 6	Chemical Engineering	Two weeks
Unit 7	Biological Engineering	Two weeks
Unit 8	Impossible Engineering!	Two weeks
Final Exam	Units 5-8	

Assignment Schedule

Each of the following must be completed to complete the course. Items with an asterisk (*) indicate that these are summative assessments for the course.

Unit	Weeks	Assignments
1	1-2	Checkpoint 1 (Non-graded) Unit 1 Critical Thinking Questions Unit 1 Lab Questions Unit 1 Activity

Unit	Weeks	Assignments
		Unit 1 Quiz Unit 1 Discussion
2	3-4	Unit 2 Critical Thinking Questions Unit 2 Lab Questions Unit 2 Activity Unit 2 Quiz Unit 2 Discussion
3	5-6	Unit 3 Critical Thinking Questions Unit 3 Lab Questions Unit 3 Activity Unit 3 Quiz Unit 3 Discussion 1 Checkpoint 2 (Non-graded)
4	7-8	Unit 4 Critical Thinking Questions Unit 4 Lab Questions Unit 4 Activity Unit 4 Quiz Unit 4 Discussion
Midterm		Midterm Discussion *Midterm Exam
5	9-10	Unit 5 Critical Thinking Questions Unit 5 Lab Questions Unit 5 Activity Unit 5 Quiz Unit 5 Discussion
6	11-12	Unit 6 Critical Thinking Questions Unit 6 Lab Questions Unit 6 Activity 1 Unit 6 Activity 2 Unit 6 Quiz Unit 6 Discussion
7	13-14	Unit 7 Critical Thinking Questions Unit 7 Lab Questions Unit 7 Activity 1 Unit 7 Activity 2 Unit 7 Quiz Unit 7 Discussion

Unit	Weeks	Assignments
8	15-16	Unit 8 Critical Thinking Questions Unit 8 Lab Questions Unit 8 Activity Unit 8 Quiz Unit 8 Discussion Checkpoint 3 (Non-graded)
Final		Final Exam Discussion *Final Exam

Course Credit

The course grade will be calculated as follows:

- 50% coursework average;
- 50% summative assessment average, including the final exam;
- A passing course grade is 70 or higher.

Students must attempt all assignments in the course. The final exam will not be available until all assignments have been accepted and graded by the teacher.

Students who score below 70% on the final exam will be eligible for one re-exam opportunity.

Coursework

The graded assignments within each lesson are formative in nature. This means that they are designed to assist you in applying and demonstrating the lesson concepts, as well as identifying areas in which you need additional review. You may use all the lesson's learning activities to assist you as you complete the graded assignments.

Summative Assessments

Summative assessments are those that allow you to demonstrate mastery of the course objectives. For summative assessments, you will NOT be allowed to use the learning materials. These are opportunities for you to show what you have learned by that point in the course. Summative assessments may be proctored using the online proctoring system Proctorio. Information about Proctorio is provided in **Remote Proctoring** in the Syllabus section of your course. The summative assessments for this course are as follows:

- Summative Assessments **(20% of Course Grade)**
 - Midterm Exam
- Summative Final Exam **(30% of Course Grade)**

Course Completion

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date.

Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

“Scholastic dishonesty” includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Student Expectations

You will be expected to log into the Blackboard course regularly to be aware of possible announcements/reminders and to pace your progress in the course.

Students are expected to maintain an online environment conducive to learning, which includes “netiquette” (Internet etiquette). Please review the basic rules for [Online Discussion Netiquette](#). Ensure that your email messages, discussion board postings, and other electronic communications are thoughtful and respectful. Diverse opinions are welcome in this course, and you are expected to demonstrate an open mind and courtesy when responding to the thoughts and ideas of others.

The following are prohibited:

- making offensive remarks in email or the discussion board;
- using inappropriate language or discussing inappropriate topics online;
- spamming;
- hacking;
- using TTU or Blackboard email or discussion boards for commercial purposes;
- using all caps (considered shouting in online communications); and
- cyber-bullying or online harassment of any type.

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Blackboard Course Messages tool for sending messages to your instructor.

Submitting Assignments

You will submit all assignments through the Blackboard Assignment Tool, rather than by mail or email.

Technical Difficulties

Getting Help

For student assistance with Blackboard, visit [TTU K-12 Support](#).

Computer Problems

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

Server Problems

When the Blackboard server needs to be taken down for maintenance, the Blackboard administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

Lost or Corrupted Files

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Blackboard server crash or virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some instances, the instructor may need to open another attempt within Blackboard, so communication with your instructor is critical in these circumstances.