# ISAT 190--Intro to ISAT--Syllabus

## Course Description

This course has been designed as an introduction to the ISAT major--both its content and its people. You will be introduced to the ISAT Problem-Centric Habits of Mind (PCHOM), and have the opportunity to develop a lively, warm, and supportive community of classmates and colleagues with whom you will begin tackling some of the world's most challenging problems.

## Suggested Learning Objectives

Why "**suggested** learning objectives" instead of just "learning objectives?" In a nutshell, it is because your instructors respect your right to choose how you spend your time and energy. While we know we could use our power to assign grades to force you to adopt **our** learning objectives, solving problems in science and technology is just a whole lot more meaningful and fun when everyone is there because they choose to be. We suggest these particular objectives because:

1. They fit our (i.e. your profs') areas of expertise--we're comfortable teaching this stuff
2. They are relevant to being wildly successful in the ISAT major
3. We honestly believe that devoting yourself to achieving these objectives will help you achieve your goals not only in college but also in your life beyond college

We suggest that you spend some time thinking about these objectives and then writing your thoughts and feelings about them in a diary or on a blog or in a journal. Personalize them. Make them your own. Come up with your own reasons why you want to achieve them. Even better, share your thoughts and feelings with us. It will make it easier for us to tailor the experience for you, and more rewarding for us. We like getting to know our students as people!

*For each of the objectives below, you are strongly urged to come up with a strategy for proving to the world that you have achieved it. Yes, as your instructors we will provide guidance and opportunities to demonstrate mastery, but our approach is not necessarily "one size fits all." If you think you have a better way to show us that you have achieved any of the objectives below, please, please share it with us!*

So without further ado, here are the suggested learning objectives.

### Objective #1: Identify and describe your own professional identity.

Who are you? What are you good at? What strengths do you bring to the table? Why do people come to you for help? The answers to these questions shape your professional identity. We want you to begin thinking about how you present yourself to others--your classmates, your professors, potential employers. This is **NOT** just a list of classes you have taken or "academic" skills that you possess. Paint a 3-dimensional picture of you as a person, your hopes and dreams, your passions and hobbies. How will you fit into our community?

Some concrete things you can do to develop your professional identity:
- Build a personal **website** (there are MANY places you can do this for free online)
- Develop your **profile** on LinkedIn and begin building a network there
- Collect examples of your best work into a **portfolio** that demonstrates what you can do
- Hone and polish your **elevator speech about who you are**
- Create and get in the habit of regularly updating your **resume**

We will ask you to do some of these things as part of the class, but all of them are activities that professionals do regularly. The key thing to do here is to tell a public story of who you are and share it with us. We will work to provide feedback that will make it better.

## Objective #2: Get to know your classmates.
## Objective #3: Get to know ALL of the faculty and staff in ISAT and the kinds of problems they are interested in solving
## Objective #4: Get to know upperclassmen in ISAT and how ISAT has shaped them as professionals

As a professional you will rely and depend daily on your team. There is almost nothing you will ever do that is solely you and you alone. You will only ever be as powerful as your team, so now is the time to start building it! Seeing every person around you as a potential friend and collaborator is a professional skill, and one of the habits of successful people. By the end of this semester, you should be able to:
- Recognize ALL of your classmates, ALL ISAT faculty and staff, and some of the ISAT upperclassmen by name and face
- Be able to advise a classmate on who to seek out if they wanted:
  - Help in calculus (or any other subject)
  - To check out a water quality testing kit
  - To get involved with hacking microcontrollers, alternative fuel vehicles, environmental activism, or some other ISAT-related extracurricular activity
  - A team member who was good at [writing/proofreading/editing], [managing projects], [raising team morale], etc.
  - Basically any person within the ISAT community to fill a need
- Describe generally the personality of all of these people
- Tell a story about an interaction with each person (that would be appropriate to share in a professional setting)

We know many people are shy or feel awkward about meeting classmates. We will create opportunities to do that are fun and not intimidating.

## Objective #5: Be able to describe ISAT to someone in your own words.
Always being ready to deliver a succinct intuitive description of your major is an important skill, not just professionally, but also in terms of shaping your identity as a member of the ISAT community. Here is a common scenario:

**Bill:** Hi! I'm Bill. Nice to meet you.
**Jill:** I'm Jill. Nice to meet you! What's your major, Bill?
**Bill:** History and pre-law. You?
**Jill:** ISAT
**Bill:** ISAT? What's that exactly?
**Jill:** Ummm…. it's kinda hard to explain…

In the worst cases, people avoid telling people they are ISAT majors because they are unsure of how to explain what it is. The truth is that ISAT is many things to many people and it's not only likely that you will get different definitions from different people, but your own definition of ISAT may change and evolve over time. We believe this is actually a strength of the program! The best way to get better at answering the "What is ISAT?" question is through practice, so expect us to ask you many times. Be ready to give this question serious thought and to see your own answer evolve over the course of the semester.

## Objective #6: Be able to distinguish "problem-centric" from "discipline-centric" approaches to problem solving.

The PC in PCHOM is "problem-centric." One of the core goals of the ISAT program is to develop engaged citizens who practice the problem-centric habits of mind (PCHOM). As such, it is pretty important to understand what we mean by this. Understanding the meaning of "problem-centric" is key to being able to understand how you, as an ISAT major, are different from students who major in only a single science or technology field, e.g. biology, computer science, chemistry, etc. Understanding "problem-centric" is key to realizing what makes ISAT special and unique not just at JMU, but across the US and even the world. In practical terms, this means you should be able to:

- Read/watch/see scientific journal articles, news articles, videos, TV programs, etc. and decide whether the problem-solving approaches described are more discipline-centric or more problem-centric
- Describe a wide range of discipline-centric approaches and articulate what the strengths and weaknesses of those approaches are
- Identify opportunities or situations where multiple disciplines have complementary strengths and weaknesses, i.e. the strengths of one discipline address the weaknesses of others
- Articulate the strengths and weaknesses of a problem-centric approach

The ability to do the above is what our ISAT alumni have repeatedly told us is what sets them apart from the people that they work with, and what makes them most valuable to the organizations to which they belong.

## Objective #7: Be able to describe a problem in a problem-centric way.

Writing and making proposals will be a ***very*** important part of your jobs moving forward.

> *A **proposal** is (usually) a written document in which you are asking someone to do something for you.*

Typically you are asking for money, time, resources, or perhaps just permission to solve some problem. The "someone" to whom you are making the proposal might be a grant-funding organization like the National Science Foundation (NSF), your boss, or a potential client of your company. The first step in all successful proposals is a clear, compelling, and concise description of the problem. To elaborate, the description of the problem must be:

- **CLEAR:** Your target audience must be able to understand all aspects of the problem that you describe, *even if the aspect is outside of the audience's area of expertise*. This is one of the hallmark strengths of ISAT graduates--the ability to take diverse technical and scientific concepts and communicate them intelligibly to almost any audience.
- **COMPELLING:** The goal is to get your audience to agree with you that the problem you describe is actually a problem. For example, if the goal of your proposal is to get resources to combat anthropomorphic (i.e. man-made) climate change, and the audience to which you are submitting the proposal doesn't agree that climate change is caused by human activity, then it hardly matters how good your proposed "solution" is since what you are addressing is not actually a problem.
- **CONCISE:** Don't be too wordy. You'll bore people.

In describing a problem, you'll draw on the knowledge and skills you developed in **Objective #6**. You'll want to describe the problem from an appropriate number of angles, through an appropriate number of disciplinary lenses, in order to demonstrate that you fully understand it. Your final project for this course, which you'll be able to add to your portfolio, will be a problem-centric description of some problem. What is an "appropriate number" of angles? That is a judgment call that you will have to learn how to make, but here are some hints:

- If you consider too few perspectives, your description of the problem will not be as **clear** or as **compelling** as it could be
- If you consider too many perspectives, your description will not be **concise**

## Objective #8: Be able to find and evaluate the quality of a variety of information sources.

In order to accomplish **Objective #7** you are going to have to do a lot of research. You will need to …