

Inventive Problem Solving (IPS)

Educational Programs

Overview

- Ideation International together with Dr. Ron Fulbright of the University of South Carolina Upstate and Dan Grimsley and Randi Dikeman of Edgecombe Community College of North Carolina have developed various educational programs based on computerized Ideation Theory of Inventive Problems Solving (I-TRIZ).
- The programs offer Inventive Problem Solving (IPS) (the first of four applications of Ideation Office of Innovation) supported with software tools such as Problem Formulator®, Ideation Brainstorming, Knowledge Wizard®(KW) and Innovation Workbench® (IWB). It also contains suitable curricula, exercises and homework. These programs are designed to be provided to any technical, marketing or business oriented individual that is seeking to become critical thinker and learn how to invent on demand.
- The programs are also suitable for enterprises that would like to establish a system for continuous innovation.



Inventive Problem Solving Programs

1. **Three-day Workshop:** delivered by Ideation International, includes real life project, with optional support (coaching/mentoring) up to two month
2. **Five- day program:** six modules per day for community college and/or continuous education students.
3. **Fifteen week program:** two lectures per week of 1 hour 15 min to undergraduates that get three credit points.
4. **Certified Innovation Professional Program:** 8 distinct lessons with learning at one's own pace.



Ideation Three-Day Workshop with a Project

- **Participants:** 1 to 18, every person has to bring his own laptop
- **Location:** Ideation Detroit Site or Customer Site
- **Material:** Every participants gets books, training information, software and refreshments.
- **Value Proposition:** Gaining knowledge of analytical thinking tools and software for overcoming complex problems and completing one project, possibly with a patentable solution.



Ideation Three-Day Workshop with a Project Agenda

Day 1 – IPS User Program

- Welcome, Administrative Details, Agenda
- I-TRIZ Fundamentals (Lecture/Exercises)
- Ideation Brainstorming, Defining Objectives (Lecture/Exercises)
- Tasks, Directions, Operators (Lecture/Exercises)
- Developing Concepts, Resources, Evaluating Results (Lecture/Exercises)
- Group Discussion, Q&A

Day 2 – IPS Practitioner Program

- Introduction to the Innovation WorkBench® (IWB) (Demo)
- Innovation Situation Questionnaire (ISQ) (Lecture/Project)
- Problem Formulation (Lecture/Exercises)
- Problem Formulation and Task Selection (Lecture/Project)
- Group Discussion, Q&A

Day 3 – IPS Practitioner Program, continued

- Generating Ideas – System of Operators (Lecture/Exercises)
- Generating Ideas (Lecture/Project)
- Developing Concepts and Evaluating Results (Lecture/Project)
- I-TRIZ System (Lecture)
- Group Discussion, Q&A



Five-Day Program for Community Colleges

- **Participants:** Available for any student of community colleges and for continuous education: professionals from any industry who work for an industrial company that develops and manufactures engineering based products. Every student has to have his own laptop.
- **Value proposition:** Gaining knowledge of analytical thinking tools and software for overcoming complex problems and completing one project, possibly with a patentable solution.
- The above program could be licensed by any community college from Edgecombe Community College, North Carolina.



Five-Day Program for Community Colleges

Day #1:

- Read the course syllabus
- Example: The Containment Ring
- Introduction to TRIZ and I-TRIZ
- How to abstract. How to conceptualize. How to draw analogies.
- Recognizing useful and harmful aspects of a system
- Homework: Identify useful and harmful aspects of a known system and a student-selected system
- Review/critique of student useful/harmful homework
- Fundamental Problem Solving Strategy (Elimination, Alternative, Resolution (EAR))
- Homework: Suggest elimination/alternative/resolution solutions to a known system
- Review/critique of student EAR homework

Day #2:

- Introduction to developing Problem Formulator (PF) diagrams
- Review of student PF homework
- The System Approach (8-way analysis)
- Evolving a PF diagram
- Review of student PF enhancements
- Introduction to Operators
- Homework: working with a small set of select operators

Day #3:

- Exam #1 – I-TRIZ history, useful/harmful functions, PF diagram fundamentals
- No class on Thursday (Fall Break)
- Review/critique of operator homework
- In-depth study of Contradiction Resolution (CR) Operators
- Time, Space, Structure, Conditions
- Homework: CR

Day #4:

- Review of student CR homework
- In-Depth study of Elimination Operators
- No class Tuesday (Election Day)
- Review of student elimination homework
- In-Depth study of Alternative Operators
- Review of student alternative homework
- Exam #2 – Elimination, Alternatives, and Contradiction Resolution

Day #5:

- Introduction to the IWB software
- Drawing PF diagrams in the IWB
- Choosing directions for innovation
- No class Thursday (Thanksgiving)
- Working with new ideas
- Review of student projects

Final Exam:



University 15-Week Program Agenda

SIMS 307 – Systematic Innovation Lesson Plan

- **Participants:** Available for any undergraduate student (engineering, marketing or business). The student gets three credit point.
- **Value proposition:** Gaining knowledge of analytical thinking tools and software for overcoming complex problems and completing one project, possibly with a patentable solution.
- The above program could be licensed by any community college from University of South Carolina Upstate.



University 15-Week Program Agenda

SIMS 307 – Systematic Innovation Lesson Plan

Week #1:

- Read the course syllabus
- Example: The Containment Ring
- Introduction to TRIZ and I-TRIZ
- How to abstract. How to conceptualize. How to draw analogies.

Week #2:

- Recognizing useful and harmful aspects of a system
- Homework: Identify useful and harmful aspects of a known system and a student-selected system
- Review/critique of student useful/harmful homework

Week #3:

- Fundamental Problem Solving Strategy (Elimination, Alternative, Resolution (EAR))
- Homework: Suggest elimination/alternative/resolution solutions to a known system
- Review/critique of student EAR homework

Week #4:

- Introduction to developing Problem Formulator (PF) diagrams
- Review of student PF homework

Week #5:

- The System Approach (8-way analysis)
- Evolving a PF diagram

Week #6:

- Review of student PF enhancements
- Introduction to Operators
- Homework: working with a small set of select operators

Week #7:

- Exam #1 – I-TRIZ history, useful/harmful functions, PF diagram fundamentals

Week #8:

- No class on Thursday (Fall Break)
- Review/critique of operator homework

Week #9:

- In-depth study of Contradiction Resolution (CR) Operators
- Time, Space, Structure, Conditions
- Homework: CR

Week #10:

- Review of student CR homework
- In-Depth study of Elimination Operators

Week #11:

- No class Tuesday (Election Day)
- Review of student elimination homework
- In-Depth study of Alternative Operators

Week #12:

- Review of student alternative homework
- Exam #2 – Elimination, Alternatives, and Contradiction Resolution

Week #13:

- Introduction to the IWB software
- Drawing PF diagrams in the IWB
- Choosing directions for innovation

Week #14:

- No class Thursday (Thanksgiving)
- Working with new ideas

Week #15:

- Review of student projects

Final Exam:



Certified Innovation Professional Program

- **Participants:** Individuals interested in improving problem solving techniques, persons with time restraints wanting to learn at their own pace. No travel necessary, all training done through the internet.
- **Value proposition:** Gaining knowledge of analytical thinking tools and software for overcoming complex problems and completing one project, possibly with a patentable solution.



Certified Innovation Professional Program Content

The CIP program is an 8-module sequence resulting in certification as an innovation professional. Students learn the fundamental theory and methodology behind I-TRIZ, a structured, systematic approach to innovative problem solving and how to use the Innovation Workbench software. The modules are:

- SCIP 501:** Introduction to TRIZ, I-TRIZ, and the Theory of Human Innovation
- SCIP 510:** Identifying Useful Functions, Harmful Functions, and Contradictions
- SCIP 521:** Resolving Contradictions: Time/Space/Structure/Condition Separation
- SCIP 522:** Problem Solving via Elimination (working with the elimination operators)
- SCIP 523:** Problem Solving via Alternatives (working with the alternatives operators)
- SCIP 530:** Modeling Systems Using Problem Formulator Diagrams
- SCIP 540:** Using the Innovation Workbench and Applying Operators
- SCIP 550:** Completing the Innovation Situation Questionnaire (ISQ)

All modules are offered by the University of South Carolina Upstate as in a self-paced format available via the Internet. Most students can complete the certification program within two months. More advanced students may complete the certification in under a month. Each module consists of a detailed student workbook, online lecture materials and assignments, and an exit quiz. Students must pass the quiz for each module to get credit for the module. Students may complete the modules in any order desired, but completing them in the order listed above is highly recommended. All modules can be started by students at any time, all year around and students may take as long as they wish to complete a module. Each module requires an average of 8 hours of a student's time. Upon completion of all 8 modules, students must pass a comprehensive examination. Successful completion of the exam entitles the student to be awarded the Certified Innovation Professional diploma to be mailed to the graduate.

