

# HUMANITARIAN ENGR SCI & TECH (HEST)

## HEST 241. HOUSEHOLD ENERGY IN GUATEMALA: BACKGROUND. (1 Credit)

An introduction to the technical, social, environmental, and economic issues surrounding energy needs for households in developing countries and the technologies and policies needed to help address them. Students are introduced to concepts about global development, needs assessment and co-design, qualitative and quantitative evaluation, and local socioeconomic conditions. This course is preparation for the 10-day Summer HEST 242 faculty-led study abroad course in Guatemala. Students from any major are invited to participate in this multidisciplinary course series.

## HEST 242. HOUSEHOLD ENERGY IN GUATEMALA: APPLICATIONS. (3 Credits)

Through immersion in rural communities during this 10-day interdisciplinary study abroad course, students will gain a deeper understanding of household energy needs in developing countries, as well as the social, environmental, technical, and economic issues surrounding technologies and policies to help meet these needs. The outcomes produced by a variety of household technologies such as biomass cookstoves will be evaluated through qualitative and quantitative data gathering, including experiments, observations, and surveys, giving students the chance to practice their research and cross-cultural communication skills under a variety of circumstances.

**Recommended:** HEST 241

## HEST 299. SPECIAL TOPICS. (1-6 Credits)

*This course is repeatable for 9 credits.*

## HEST 310. \*INTRO TO COMMUNITY ENGAGEMENT AND COMMUNITY-BASED DESIGN. (3 Credits)

Includes study of civic problems and issues, design-thinking concepts and application to co-design of engineering, science and technology-based solutions with social impact, and development of dispositions for effective community engagement through field study and service-learning. Recommended course for student wanting to complete a HEST internship. (Bacc Core Course)

**Attributes:** CSST – Core, Synthesis, Science/Technology/Society

## HEST 320. \*ENGINEERING FOR GLOBAL HEALTH SOLUTIONS. (3 Credits)

An introduction to the critical processes and drivers involved in the development of engineering solutions to address global health problems. Topics include world health challenges, accessing and interpreting health and economic data, basic healthcare systems around the world, the importance of ethical guidelines in ensuring the protection of human subjects, the process of cost effectiveness assessment of a technology, and the timescale and hurdles to adoption of a technology. (Bacc Core Course)

**Attributes:** CSST – Core, Synthesis, Science/Technology/Society

## HEST 399. SPECIAL TOPICS. (1-6 Credits)

*This course is repeatable for 9 credits.*

## HEST 411. ENGINEERING DESIGN FOR EMERGENCY & LOW-RESOURCE ENVIRONMENTS. (3 Credits)

Introduces the challenges of engineering in emergency and low-resource environments, concepts of appropriate technologies and response, and engineering design of discrete services and technologies such as water systems, environmental health systems and infrastructure.

**Recommended:** Completion of an undergraduate engineering fluid mechanics course

## HEST 412. \*MULTIDISCIPLINARY CASE STUDIES IN HUMANITARIAN ENGINEERING, SCIENCE AND TECHNOLOGY. (3 Credits)

Introduces students to multidisciplinary methods and perspectives applied to case studies in humanitarian engineering, science and technology. Applications to real world issues with global implications at the interface of humanity and nature are addressed from a systems perspective using a case study approach.

**Attributes:** CSST – Core, Synthesis, Science/Technology/Society

## HEST 499. SPECIAL TOPICS. (1-6 Credits)

*This course is repeatable for 9 credits.*

## HEST 511. ENGINEERING DESIGN FOR EMERGENCY & LOW-RESOURCE ENVIRONMENTS. (3 Credits)

Introduces the challenges of engineering in emergency and low-resource environments, concepts of appropriate technologies and response, and engineering design of discrete services and technologies such as water systems, environmental health systems and infrastructure.

**Recommended:** Completion of an undergraduate engineering fluid mechanics course

## HEST 512. MULTIDISCIPLINARY CASE STUDIES IN HUMANITARIAN ENGINEERING, SCIENCE AND TECHNOLOGY. (3 Credits)

Introduces students to multidisciplinary methods and perspectives applied to case studies in humanitarian engineering, science and technology. Applications to real world issues with global implications at the interface of humanity and nature are addressed from a systems perspective using a case study approach.

## HEST 541. HOUSEHOLD ENERGY IN GUATEMALA: BACKGROUND. (1 Credit)

An introduction to the technical, social, environmental, and economic issues surrounding energy needs for households in developing countries and the technologies and policies needed to help address them.

Students are introduced to concepts about global development, needs assessment and co-design, qualitative and quantitative evaluation, and local socioeconomic conditions. This course is preparation for the 10-day Summer HEST 542 faculty-led study abroad course in Guatemala. Students from any major are invited to participate in this multidisciplinary course series.

## HEST 542. HOUSEHOLD ENERGY IN GUATEMALA: APPLICATIONS. (3 Credits)

Through immersion in rural communities during this 10-day interdisciplinary study abroad course, students will gain a deeper understanding of household energy needs in developing countries, as well as the social, environmental, technical, and economic issues surrounding technologies and policies to help meet these needs. The outcomes produced by a variety of household technologies such as biomass cookstoves will be evaluated through qualitative and quantitative data gathering, including experiments, observations, and surveys, giving students the chance to practice their research and cross-cultural communication skills under a variety of circumstances.

**Recommended:** HEST 541

**HEST 599. SPECIAL TOPICS. (1-6 Credits)**

*This course is repeatable for 9 credits.*