ASEF Project Category Guidelines 2024-2025

The Alabama Science and Engineering Fair (ASEF) will use the following category structure for 2025 to align with the Regeneron International Science and Engineering Fair (ISEF) categories.

The official list of the Regeneron ISEF project categories can be found at https://www.societyforscience.org/isef/categories-and-subcategories/

Individual school fairs and affiliated regional fairs may choose to set up categories that work for their individual programs. However, once fair winners are advanced to ASEF, teachers and students should review the category descriptions to ensure that their project fits and are required to select one of the ASEF categories listed below.

NOTE: ASEF Fair Directors reserve the right to reassign projects to different categories to ensure that the project is reviewed and scored by the most appropriate judges possible.

	ASEF category	ISEF category
100	Animal and Plant Sciences	Animal Sciences (ANIM) Plant Sciences (PLNT)
200	Behavioral & Social Sciences	Behavioral and Social Sciences (BEHA)
300	Cell, Molecular, Microbiology & Biochemistry	Microbiology (MCRO) Cellular and Molecular Biology (CELL) Biochemistry (BCHM)
400	Chemistry	Chemistry (CHEM) Materials Science (MATS)
500	Engineering	Engineering Technology: Statics and Dynamics (ETSD)
600	Energy	Energy: Sustainable Materials and Design (EGSD)
700	Earth and Environmental Sciences & Environmental Engineering	Earth and Environmental Sciences (EAEV) Environmental Engineering (ENEV)
800	Biomedical Engineering & Biomedical and Health Sciences	Bio-Medical Engineering (ENBM) Biomedical and Health Sciences (BMED) Translational Medical Science (TMED)
900	Physics, Astronomy & Mathematics	Physics and Astronomy (PHYS) Mathematics (MATH)
1100	Robotic Systems & Communication Technology	Robotics and Intelligent Machines (ROBO) Systems Software (SOFT) Embedded Systems (EBED)
1200	Computational and Bioinformatics Sciences	Computational Biology and Bioinformatics (CBIO)

CATEGORY 100 – Animal, Plant, Computational & Bioinformatics Sciences

ANIMAL SCIENCES (Code: ANIM) - This category includes all aspects of animals and animal life, animal life cycles, and animal interactions with one another or with their environment. Examples of investigations included in this category would involve the study of the structure, physiology, development, and classification of animals, animal ecology, animal husbandry, entomology, ichthyology, ornithology, and herpetology, as well as the study of animals at the cellular and molecular level which would include cytology, histology, and cellular physiology. Project subcategories could include:

Animal Behavior
Cellular Studies
Development
Ecology
Genetics
Nutrition and Growth
Physiology
Systematics and Evolution

PLANT SCIENCES (Code: PLNT) - Studies of plants and how they live, including structure, physiology, development, and classification. Includes plant cultivation, development, ecology, genetics and plant breeding, pathology, physiology, systematics, and evolution. Project subcategories could include:

Agriculture and Agronomy
Ecology
Genetics and Breeding
Growth and Development
Pathology
Plant Physiology
Systematics and Evolution

CATEGORY 200 – Behavioral & Social Sciences

BEHAVIORAL AND SOCIAL SCIENCES (Code: BEHA) - The science or study of the thought processes and behavior of humans and other animals in their interactions with the environment studied through observational and experimental methods. Project subcategories could include:

Clinical & Developmental Psychology
Cognitive Psychology
Neuroscience

Physiological Psychology
Sociology and Social Psychology

CATEGORY 300 – Cell, Molecular, Microbiology & Biochemistry

CELLULAR AND MOLECULAR BIOLOGY (Code: CELL) - This is an interdisciplinary field that studies the structure, function, intracellular pathways, and formation of cells. Studies involve understanding life and cellular processes specifically at the molecular level. Project subcategories could include:

Cell Physiology
Cellular Immunology
Genetics
Molecular Biology
Neurobiology

MICROBIOLOGY (Code: MCRO) - The study of micro-organisms, including bacteria, viruses, fungi, prokaryotes, and simple eukaryotes as well as antimicrobial and antibiotic substances. Project subcategories could include:

Antimicrobial and Antibiotics
Applied Microbiology
Bacteriology
Environmental Microbiology
Microbial Genetics
Virology

BIOCHEMISTRY (Code: BCHM) - The study of the chemical basis of processes occurring in living organisms, including the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment. Project subcategories could include:

Analytical Biochemistry
General Biochemistry
Medicinal Biochemistry
Structural Biochemistry

CATEGORY 400 – Chemistry

CHEMISTRY (Code: CHEM) - Studies exploring the science of the composition, structure, properties, and reactions of matter not involving biochemical systems. Project subcategories could include:

Analytical Chemistry
Computational Chemistry
Environmental Chemistry
Inorganic Chemistry
Materials Chemistry
Organic Chemistry
Physical Chemistry

MATERIALS SCIENCE (Code: MATS) - The study of the integration of various materials forms in systems, devices, and components that rely on their unique and specific properties. It involves their synthesis and processing in the form of nanoparticles, nanofibers, and nanolayered structures, to coatings and laminates, to bulk monolithic, single-/poly-crystalline, glassy, soft/hard solid, composite, and cellular structures. It also involves measurements of various properties and characterization of the structure across length scales, in addition to multi-scale modeling and computations for process-structure and structure-property correlations. Project subcategories could include:

Biomaterials
Ceramic and Glasses
Composite Materials
Computation and Theory
Electronic, Optical, and Magnetic Materials
Nanomaterials
Polymers

CATEGORY 500 – Engineering Technology: Statics and Dynamics

ENGINEERING TECHNOLOGY: STATICS AND DYNAMICS (Code: ETSD) - Studies that focus on the science and engineering that involve movement or structure. The movement will be a result of forces; the structure will be stable due to the equilibrium of forces. Project subcategories could include:

Aerospace and Aeronautical Engineering
Civil Engineering
Computational Mechanics
Control Theory
Ground Vehicle Systems
Industrial Engineering-Processing
Mechanical Engineering
Naval Systems

CATEGORY 600 – Energy

ENERGY: SUSTAINABLE MATERIALS & DESIGN (EGSD) - Studies/processes involving the production and/or storage of energy. Project subcategories could include:

Biological Process and Design
Solar Process, Materials, and Design
Energy Storage
Wind and Water Movement Power Generation
Hydrogen Generation and Storage
Thermal Generation and Design
Triboelectricity and Electrolysis

Electronic, Optical, and Magnetic Materials
Nanomaterials
Polymers

CATEGORY 700 – Earth and Environmental Sciences & Environmental Engineering

EARTH AND ENVIRONMENTAL SCIENCES (Code: EAEV) - Studies of the environment and its effect on organisms/systems, including investigations of biological processes such as growth and life span, as well as studies of Earth systems and their evolution. Project subcategories could include:

Atmospheric Science
Climate Science
Environmental Effects on Ecosystems
Geosciences
Water Science

ENVIRONMENTAL ENGINEERING (Code: ENEV) - Studies of the environment and its effect on organisms/systems, including investigations of biological processes such as growth and life span, as well as studies of Earth systems and their evolution. Project subcategories could include:

Bioremediation
Land Reclamation
Pollution Control
Recycling and Waste Management
Water Resources Management

CATEGORY 800 – Biomedical Engineering & Biomedical and Health Sciences

BIOMEDICAL ENGINEERING (Code: ENBM) - Projects that involve the application of engineering principles and design concepts to medicine and biology for healthcare purposes including diagnosis, monitoring and therapy. Prominent biomedical engineering applications include the development of biocompatible prostheses, various diagnostic and therapeutic medical devices ranging from clinical equipment to micro-implants, common imaging equipment such as MRIs and EEGs, regenerative tissue growth, pharmaceutical drugs and therapeutic biologicals. Project subcategories could include:

Biomaterials and Regenerative Medicine
Biomechanics
Biomedical Devices
Biomedical Sensors and Imaging
Cell and Tissue Engineering
Synthetic Biology

BIOMEDICAL AND HEALTH SCIENCES (Code: BMED) - This category focuses on studies specifically designed to address issues of human health and disease. It includes studies on the diagnosis, treatment, prevention or epidemiology of disease and other damage to the human body or mental systems. Includes studies of normal functioning and may investigate internal as well as external factors such as feedback mechanisms, stress or environmental impact on human health and disease. Project subcategories could include:

Cell, Organ, and Systems Physiology
Genetics and Molecular Biology of Disease
Immunology
Nutrition and Natural Products
Pathophysiology

Translational Medical Science (Code: TMED) - Projects that aim to improve human health and longevity by translating novel discoveries in the biomedical sciences into effective activities and tools for clinical and public health use. Bi-directional in concept, projects can be those developed through basic research moving toward clinical testing (bench-to-bedside) or projects that provide feedback about the applications of new treatments and how they can be improved (beside-to-bench). Project subcategories could include:

Disease Detection and Diagnosis
Disease Prevention
Disease Treatment and Therapies
Drug Identification and Testing
Pre-Clinical Studies

CATEGORY 900 – Physics, Astronomy & Mathematics

PHYSICS AND ASTRONOMY (Code: PHYS) - Physics is the science of matter and energy and of interactions between the two. Astronomy is the study of anything in the universe beyond the Earth. Project subcategories could include:

Atomic, Molecular, and Optical Physics
Astronomy and Cosmology
Biological Physics
Condensed Matter and Materials
Mechanics
Nuclear and Particle Physics
Theoretical, Computational, and Quantum Physics

MATHEMATICS (Code: MATH) - The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols. The deductive study of numbers, geometry, and various abstract constructs, or structures. Project subcategories could include:

Algebra
Analysis
Combinatorics, Graph Theory, and Game Theory
Geometry and Topology
Number Theory
Probability and Statistics

CATEGORY 1100 – Robotic Systems and Communication Technology

ROBOTICS AND INTELLIGENT MACHINES (Code: ROBO) - Studies in which the use of machine intelligence is paramount to reducing the reliance on human intervention. Project subcategories could include:

Biomechanics
Cognitive Systems
Control Theory
Machine Learning
Robot Kinematics

SYSTEMS SOFTWARE (Code: SOFT) - The study or development of software, information processes or methodologies to demonstrate, analyze, or control a process/solution. Project subcategories could include:

Algorithms
Cybersecurity
Databases
Human/Machine Interface
Languages and Operating Systems
Mobile Apps
Online Learning

EMBEDDED SYSTEMS (Code: EBED) - Studies involving electrical systems in which information is conveyed via signals and waveforms for purposes of enhancing communications, control and/or sensing.

Circuits
Internet of Things
Microcontrollers
Networking and Data Communications
Optics
Sensors
Signal Processing

CATEGORY 1200 – Computational and Bioinformatics Sciences

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS (Code: CBIO) - Studies that primarily focus on the discipline and techniques of computer science and mathematics as they relate to biological systems. This includes the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavior, and social systems. Project subcategories could include:

Computational Biomodeling
Computational Epidemiology
Computational Evolutionary Biology
Computational Neuroscience
Computational Pharmacology
Genomics