STANDARD METEOROLOGY MAJOR

CHARACTERISTICS OF THE STANDARD METEOROLOGY MAJOR INCLUDE:
• Strong emphasis on mathematical and calculus skills
  • Three college calculus classes (minimum 10 units at SJSU)
  • Pre-calculus class for some (3 units at SJSU)
  • Differential equations class (for some; 3 units at SJSU)
• Calculus-based physics sequence – 3 semesters (12 units at SJSU)
• Required Meteorology classes covering:
  • Atmospheric Dynamics
  • Atmospheric Thermodynamics
  • Atmospheric Physics (Cloud Physics, Radiation & Radiative Transfer)
  • Synoptic Meteorology (Analysis & Forecasting)
  • Remote Sensing (Satellites & Radar)
  • Climate
  • Data Analysis (statistics)
  • Programming
  • Instruments
  • Mesoscale Meteorology
  • Etc.

THE CLIMATE SCIENCE MAJOR

JUSTIFICATIONS FOR THE NEW MAJOR:
• AN EMERGING NEED FOR CLIMATE-LITERATE SCIENTISTS WITH THE FOLLOWING SKILLS:
  • ANALYSIS OF DATA (OBSERVATIONAL & MODEL)
  • EXPERIENCE WITH MODELS (e.g. CLIMATE OR CARBON MODELS)
  • THE IMPACTS OF CLIMATE CHANGE
  • ENERGY AND MITIGATION STRATEGIES
  • UNDERSTANDING OF BROAD CONNECTIONS TO ENERGY, WATER, AND FOOD
  • PROGRAMMING AND TECHNICAL
• PLUS A NEED TO ENSURE EMPLOYERS THAT STUDENTS HAVE EXPERIENCE SOLVING REAL
CLIMATE SCIENCE PROBLEMS USING THEIR TECHNICAL SKILLS

CLASSES IN THE NEW MAJOR

CORE SCIENCE CLASSES
1st semester calculus (MATH 30)
1st semester college Chemistry (CHEM 1A)
Non-calculus based Physics sequence (PHYS 2A,B)
1st semester college Biology (BIOL 1A)

DEPTH CLASSES
ADVANCED CLIMATOLOGY (METR 123)
GLOBAL CLIMATE MODELING (METR 173)
THE GLOBAL CARBON CYCLE (METR 135)
GLOBAL CLIMATE SOLUTIONS (METR 174 – capstone project class)

BREADTH CLASSES
ENERGY & ENVIRONMENT (ENVS 133)
COMMUNICATION & ENVIRONMENT (COMS 146F)
LIFE CYCLE ENGINEERING (ENGR 103)

SKILLS CLASSES
STATISTICS (METR 136)
METEOROLOGICAL COMPUTING (METR 50/51 – FORTRAN/MATLAB)

ELECTIVES (3 classes from):
Water Resource Management; Food Supply & Agricultural Systems; Remote Sensing, GIS; Energy Policy Analysis; Environmental Economics & Policy; Environmental Law; Solar Energy Theory; Solar Home Design; & others

CONSTRAINTS OF METEOROLOGY DEGREE
• Strong emphasis on short-term atmospheric state and evolution (to ~10 days)
• Emphasis on forecasting (in undergraduate programs)
• No room in the curriculum for emerging areas (120 unit limit)
• Less attention to current climate, climate change and its impacts
• Climate change itself (current science, uncertainties, paleoclimate studies)
• Impacts (food & water supply, diseases, societal impacts…)
• Mitigation strategies (energy and economics)
• Math/Physics-heavy
• Roadblock for many students who still possess strong interest and technical ability

FOUR-YEAR ROADMAP TO GRADUATION

CONCLUSIONS
• Early student interest has been very positive.
• Most new classes have been successfully taught in the past two years.
• No graduates yet!
• Challenges remain in hiring additional faculty to support the new degree.
• Next step: make this a new stand-alone major.