

Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate ♦ Graduate ♦ Professional
♦ Proposal Checklist ♦

Program request type: Undergraduate Graduate First Professional (ex., DVM, JD, MD, etc.)

Requested by the Department or Unit of: Texas A&M Energy Institute

Program Type, Level, Designation, Title, Description, Hours

Program Type: Certificate Program Degree Program

Program Level: UG Certificate Grad Certificate Bachelor Master Doctoral Professional

Degree Designation (i.e., BS, BA, MA, MS, MAgr, MEd, PhD, EdD, etc.) _____

Title of proposed program: Certificate in Energy

Proposed CIP Code (if known): 30.9999.04

Brief program description (provide a catalog description for undergraduate and graduate certificates):

The "Certificate in Energy" program, through 10 modules of the "Professional Master of Science in Energy" program, is designed to introduce students/professionals to fundamentals and state of the art advances in the multiple interdisciplinary facets of energy.

Minimum program semester credit hours (SCH) Certificates - 12 hours* Bachelors - 120 hours Masters - 30 hours

Proposed program hours: 15 _____ _____

*12 hours minimum to appear on transcript

Certificate Programs Embedded Standalone

Students take coursework that will result in a degree and certificate being earned at the same time.

Non-degree seeking students take coursework to earn a certificate only (no degrees are awarded).

Off-Campus or Distance Delivery

% of Program a student can take off-campus or through Distance Education	Program Start Date	SACSCOC Approval**	When Provost needs to inform SACSCOC
<input checked="" type="checkbox"/> 25%	_____	Notification Only	_____
<input type="checkbox"/> 50%	_____	Approval Required	6 months before first day of program
<input type="checkbox"/> 80%	_____	Approval Required	6 months before first day of program
<input type="checkbox"/> 100%	_____	Approval Required	6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.

Program Delivery Mode

Location

On-campus Texas A&M University, College Station Campus

Broadcast / TTVN _____

Specific off-campus location*** _____

Distance Education / Internet In-State Out-of-State Start Date Fall 2015

Out-of-Country Will this program be offered with another institution? Yes No

If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.

***Is this an approved SACSCOC location? Yes No If no, a program prospectus must be sent to SACSCOC. Approved locations as of March 2012: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, CityCentre-Houston, Dubai and Saudi Arabia.

Program Funding

Has program funding been finalized at the department or college level? Yes No

If no, explain or attach budget: _____

Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate ♦ Graduate ♦ Professional
♦ Proposal Checklist ♦

Will new costs for the first five years of the program be under \$2 million?
If new costs exceed \$2 million, coordinating board approval is required.

Yes

No

Submitted by (Contact Person):

Dr. Costas N. Georghiades

georghiades@tamu.edu

Name

Email

Interim Director of Texas A&M Energy Institute

979-845-7408

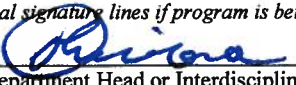
Title


Phone

Certification Statement

By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the *Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically*.

Use additional signature lines if program is between three or more departments or colleges

 5/22/14
Signature, Department Head or Interdisciplinary Program Chair
Dr. Costas N. Georghiades

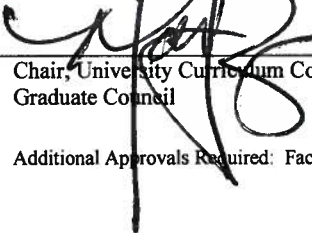
 5/22/14
Signature, Department Head or Interdisciplinary Program Chair (if joint program)

Typed or Printed Name
 9/22/14
Chair, College Review Committee Date

Typed or Printed Name
 9/22/14
Chair, College Review Committee Date

 9/22/14
Dean of College Date

 9/22/14
Dean of College Date

 11/21/14
Chair, University Curriculum Committee or Graduate Council Date

 11/21/14
Chair, University Curriculum Committee or Graduate Council Date

Additional Approvals Required: Faculty Senate and President.

New Program Request Form for Certificate Programs

Directions: An institution shall use this form to propose a new bachelor's or master's degree program. In completing the form, the institution should refer to the document *Standards for Bachelor's and Master's Programs*, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

Administrative Information

1. Institution: Texas A&M University
2. Program Name – Show how the program would appear on the Coordinating Board's program inventory (e.g., *Bachelor of Business Administration degree with a major in Accounting*):
Certificate in Energy
3. Proposed CIP Code: 30.9999.04
4. Brief Program Description – Describe the program and the educational objectives:

The “**Certificate in Energy**” program is designed to introduce students/professionals to the multiple interdisciplinary facets of energy that range from overview of energy technologies (fossil-based, renewable, and non-fossil based), to multi-scale energy systems engineering methods, to materials for energy, to economics and finance, to business, to entrepreneurship, to law, and their interactions.

The educational objectives of the “**Certificate in Energy**” program are:

1. Educate students/professionals with the broad spectrum of important energy issues, energy technologies based on fossil and non-fossil resources, sustainable energy technologies, and their interactions with energy economics, entrepreneurship, law, and policy.
2. Enhance the quantitative skills and knowledge of students/professionals for the analysis, simulation, and optimization of energy systems, and prepare them for practical applications.

Number of Semester Credit Hours Required **15**

5. Administrative Unit – Identify where the program would fit within the organizational structure of the university (e.g., *The Department of Electrical Engineering within the College of Engineering*):
Texas A&M Energy Institute

6. Proposed Implementation Date – Report the first semester and year that students would enter the program:

Fall 2015

7. Contact Person – Provide contact information for the person who can answer specific questions about the program:

Name: Dr. Costas N. Georghiades

Title: Interim Director, Texas A&M Energy Institute

E-mail: georghiades@tamu.edu

Phone: 979-845-7408

AND

Name: Dr. Christodoulos A. Floudas

Title: Director of Texas A&M Energy Institute (Effective: February 1, 2015)

E-mail: floudas@princeton.edu, floudas@tamu.edu

Phone: 609-258-4595

Program Information

I. Need

Note: Complete I.A and I.B only if preliminary authority for the program was granted more than four years ago. This includes programs for which the institution was granted broad preliminary authority for the discipline.

A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.

Not Applicable; preliminary approval was not granted more than four years ago.

B. Student Demand – Provide short- and long-term evidence of demand for the program.

Not Applicable; preliminary approval was not granted more than four years ago.

- C. **Enrollment Projections** – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. *(Include majors only and consider attrition and graduation.)*

YEAR	1	2	3	4	5
Headcount	5	10	15	20	20
FTSE					

II. Quality

- A. **Certificate and Degree Requirements** – Use this table to show the certificate and degree requirements of the program. *(Modify the table as needed; if necessary, replicate the table for more than one option.)*

Category	Semester Credit Hours
General Education Core Curriculum <i>(bachelor's degree only)</i>	
Required Courses (Modules) One Module 1s equal to 1.5 SCH	10.5
Prescribed Electives (Module) One Module 1s equal to 1.5 SCH	4.5
Free Electives	
Other <i>(Specify, e.g., internships, clinical work)</i>	(if not included above)
TOTAL	15

- B. **Curriculum** – Use these tables to identify the required courses and prescribed electives of the program, and curriculum as it will appear in the undergraduate and graduate catalog. Note with an asterisk (*) courses that would be added if the program is approved. *(Add and delete rows as needed. If applicable, replicate the tables for different tracks/options as shown in the undergraduate catalog.)*

<u>Prefix & Number</u>	<u>Required Courses</u>	<u>SCH</u>
ICPE-601	Environmental Issues of Energy Systems	1.5
ICPE-602	Reservoir Characterization and Modeling	1.5
ICPE-603	Bioenergy	1.5
ICPE-604	Energy Systems Engineering I	1.5
ICPE-607	Energy Accounting	1.5
ICPE-608	Beyond Science and Technology:	
	The Role of Policy in the Future of Energy in the US	1.5
ICPE-609	Introduction to U.S. Energy Law & Policy	1.5

<u>Prefix & Number</u>	<u>Prescribed Elective Courses</u>	<u>SCH</u>
ICPE-605	Energy Systems Engineering II	1.5
ICPE-606	Introduction to Optimization	1.5
ICPE-610	The Global Energy Future	1.5
ICPE-611	Economics of Energy	1.5
ICPE-612	Entrepreneurship in Energy	1.5
ICPE-613	Natural and Shale Gas Monetization: Technologies, Fundamentals, Economics, and Applications	1.5
ICPE-614	CO2 Sequestration	1.5
ICPE-615	Smart Grid Fundamentals	1.5
ICPE-616	Multi-functional Materials for Energy Conversion	1.5
ICPE-617	Gas Separations for Energy: Fundamentals, Applications and New Directions	1.5
ICPE-618	Carbon Capture, Utilization, and Storage	1.5
ICPE-619	Nanomaterials Engineering and Energy Storage	1.5
ICPE-620	Thermoelectric Materials and Devices	1.5
ICPE-621	Thermoelectrics: Fundamentals of Electronic and Thermal Transport	1.5
ICPE-622	Energy Efficiency in Buildings	1.5
ICPE-623	Water-Energy-Food Nexus	1.5
ICPE-624	Energy-Water Nexus	1.5
ICPE-625	Integrated Risk Management for Exploration and Production Projects	1.5
ICPE-626	Safety in Energy Systems	1.5
ICPE-627	Interfacial Phenomena of Energy Systems	1.5
ICPE-628	Multi-physics Geomechanics for Energy Applications	1.5

C. Faculty – Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. (Add and delete rows as needed.)

<u>Faculty Name & Rank</u>	<u>Highest Degree & Awarding Institution</u>	<u>Module Assigned</u>	<u>%Time</u>
Akbulut, Mustafa	PhD Chemical Engineering; UCSB	ICPE-601 & 627	10
Datta-Gupta, Akhil	PhD Petroleum Engineering; UT Austin	ICPE-602	5
King, Michael	PhD Physics; Syracuse University	ICPE-602	5
Holtzapple, Mark	PhD Chemical Engineering; U. Pennsylvania	ICPE-603	5
Capareda, Sergio	PhD Agricultural Engineering; Texas A&M	ICPE-603	5
Floudas, Christodoulos	PHD Chemical Engineering; Carnegie Mellon	ICPE-604 & 605	10
Pistikopoulos, Efstratios	PhD Chemical Engineering; Carnegie Mellon	ICPE-604 & 605	10
Butenko, Sergiy	PhD Industrial Engineering; U. Florida	ICPE-606	5
Deer, Shannon	MSC Finance; Texas A&M	ICPE-607	5
Vedlitz, Arnold	PhD Political Science; U. Houston	ICPE-608	5
Warren, Gina	JD Law; Rutgers University	ICPE-609	5

Eckstein, Gabriel	JD, LLM Law; American University	ICPE-610	5
McCarl, Bruce	PhD Management Science; Penn State Univ.	ICPE-611	5
Lester, Richard	PhD Strategic Management; Texas A&M	ICPE-612	5
Elbashir, Nimir	PhD Chemical Engineering; Auburn Univ.	ICPE-613	5
El-Halwagi, Mahmoud	PhD Chemical Engineering; UCLA	ICPE-613&624	10
Gibson, Richard	PhD Geophysics, MIT	ICPE-614	5
Kezunovic, Mladen	PhD Electrical Engineering, U. Kansas	ICPE-615	5
Singh, Chanan	PhD Electrical Engineering, U. Saskatchewan	ICPE-615	5
Xie, Le	PhD Electrical & Computing Eng, Carnegie Mellon	ICPE-615	5
Balog, Robert	PhD Electrical Engineering, U. Illinois, Urbana	ICPE-615	5
Boyd, Jim	PhD Aerospace Engineering, Texas A&M	ICPE-616	5
Lagoudas, Dimitris	PhD Applied Mathematics, Lehigh University	ICPE-616	5
Arroyave, Raymundo	PhD Materials Science, MIT	ICPE-616	5
Wilhite, Benjamin	PhD Chemical Engineering, Notre Dame	ICPE-617	5
Hasan, M.M. Faruque	PhD Chemical Engineering, National U. Singapore	ICPE-618	5
Lutkenhaus, Jodie	PhD Chemical Engineering, MIT	ICPE-619	5
Green, Micah	PhD Chemical Engineering, MIT	ICPE-619	5
Vaddiraju, Sreeram	PhD Chemical Engineering, U. Louisville	ICPE-620	5
Yu, Choongho	PhD Mechanical Engineering, U. Texas Austin	ICPE-621	5
Claridge, David	PhD Physics, Stanford University	ICPE-622	5
Culp, Charles	PhD Solid State Physics, Iowa State University	ICPE-622	5
Mohtar, Rabi	PhD Agricultural Technology, Michigan State U.	ICPE-623	5
Damnjanovic, Ivan	PhD Civil Engineering, U. Texas Austin	ICPE-625	5
Medica-Cetina, Zenon	PhD Stochastic Mechanics, Johns Hopkins U.	ICPE-625	5
Mannan, Sam	PhD Chemical Engineering, U. Oklahoma	ICPE-626	5
Sanchez, Marcelo	PhD Civil Engineering, U. Polit. de Catalunya	ICPE-628	5

- D. Students – Describe general recruitment efforts and admission requirements. How will students be accepted into the program? In accordance with the institution's Uniform Recruitment and Retention Strategy, describe plans to recruit, retain, and graduate students from underrepresented groups for the program.

The “Certificate in Energy” program targets two broad categories. Category 1 consists of graduating seniors from diverse educational backgrounds (e.g., sciences, engineering, social sciences, business) and domestic and international institutions (e.g., US and Canada, Central and South America, Europe, Middle East, and Asia). Category 2 consists of recent graduates/professionals who have been in industry and/or government for less than 3-5-10+ years.

We will aim for a diverse, dynamic, and high quality student body. To attain this goal, we will advertise the proposed innovative “Certificate in Energy” program through the Energy Institute website, departmental websites, colleges’ websites, and the University website. In addition, we will provide material and ask all the department heads to assist us in advertising the program on campus, as well as provide material to many universities in the US, South America, Europe, Middle East and Asia.

- E. Library – Provide the library director's assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program.

The library needs for the "Certificate in Energy" program are standard and do not require any special resources. Current library holdings are sufficient.

- F. Facilities and Equipment – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

A few (i.e., 2-3) classrooms with capabilities for distance learning (e.g., video recording and conferencing) will be required for the program.

- G. Accreditation – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

No accreditation from a national accrediting body is needed.

- H. Evaluation – Describe the evaluation process that will be used to assess the quality and effectiveness of the new degree program.

The Advisory and Evaluation Committee, (A&EC) will consist of the Heads of departments or Deans who have faculty members participating in the courses of the (ICPE): Drs. Karim (Chemical Engineering), Hill (Petroleum Engineering), Searcy (Biological & Agricultural Engineering), Malave (Industrial & Systems Engineering), Benjamin (Accounting, Mays Business School), Crocker (Dean, The Bush School of Government and Public Policy), Moriss (Dean of Law School), Rosson (Agricultural Economics), Griffin (Management, Mays Business School), Giardino (Geology and Geophysics), Singh (Electrical & Computer Engineering), Bowersox (Aerospace Engineering), Karaman (Materials Science & Engineering), Polycarpou (Mechanical Engineering), Wells (Architecture), Autenrieth (Civil Engineering). Annually, one of the Heads/Deans will be selected to serve as the Lead of the A&EC.

The Executive Committee will consist of the Vice President for Research, VPR, the Deans of the College of Agriculture & Life Sciences; College of Engineering; College of Geosciences; and College of Sciences, as well as External Assessors to be selected. Annually, one of the Deans/VPR will be selected to serve as the Lead of the Executive Committee.

The Texas A&M Energy Institute will develop an appropriate annual or biannual review process to evaluate the impact of the "Certificate in Energy" program. The review will include evaluations of graduate recruitment, retention, curriculum, research, and faculty teaching assessments. The annual or biannual review of the program will be conducted in a timely fashion to assure proper assessment of prior activities and appropriate feedback mechanism for improvement.

- I. Administration of Program – Describe how the program will be administered.
Where will the program be administered (i.e., department, college)?

The program will be administered by the Texas A&M Energy Institute.

III. Costs and Funding

Five-Year Costs and Funding Sources - Use this table to show five-year costs and sources of funding for the program.

Five-Year Costs

Personnel	
Faculty	\$150,000 (honoraria for faculty)
Administration	\$50,000
Graduate Assistants	0
Other Personnel	0
Facilities, Equipment &IT	\$25,000
Supplies & Materials	\$25,000
Library	0
Other (seminars)	\$25,000 (travel & accommodation expenses for seminars)
Total Five Year Costs	= \$275,000

Five year Funding/Income

Tuition and Program fee = \$20,000

Year 1 (5 students): income from tuition and program fees= \$100,000

Year 2 (10 students): income from tuition and program fees= \$200,000

Year 3 (15 students): income from tuition and program fees= \$300,000

Year 4 (20 students): income from tuition and program fees= \$400,000

Year 5 (20 students): income from tuition and program fees= \$400,000

Total Five Year Income = \$1,400,000

Signature Page

1. Adequacy of Funding – The chief executive officer shall sign the following statement:

I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.

Chief Executive Officer

Date

2. Board of Regents or Designee Approval – A member of the Board of Regents or designee shall sign the following statement:

On behalf of the Board of Regents, I approve the program.

Board of Regents (Designee)

Date of Approval

3. Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner
Approval – For a program to be approved by the Commissioner or
the Assistant Commissioner for Academic Affairs and Research, the Board of
Regents or designee must certify that the new program meets the eight criteria under
TAC Section 5.50 (b): The criteria stipulate that the program shall:

- (1) be within the institution's current Table of Programs;
- (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
- (3) have sufficient clinical or in-service sites, if applicable, to support the program;
- (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
- (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
- (6) not unnecessarily duplicate existing programs at other institutions;
- (7) not be dependent on future Special Item funding
- (8) have new five-year costs that would not exceed \$2 million.

On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).

Board of Regents (Designee)

Date