

FACULTY SENATE

June 14, 2016

MEMORANDUM

TO: Michael K. Young, President  
FROM: Leonard Bierman, Speaker *LB*  
SUBJECT: Graduate Council (FS.34.5)

The Faculty Senate submits for your approval the item from the Graduate Council at its regular meeting on June 13, 2016. Attached is a copy of the material sent to our Senators.

**Special Consideration Item**  
Industrial Engineering  
Industrial Data Analytics  
Proposal for New Certificate Program

FACULTY SENATE AGENDA ITEM REVIEW

This item has been reviewed by the Office of the Provost (OP). Below are recommended action(s): FS.34.5

cc: Karan Watson  
Michael Benedik  
John August  
M. Katherine Banks

<i>Presidential Action:</i> <input checked="" type="checkbox"/> Recommend Approval <input type="checkbox"/> Review Only	<i>OP Recommended Action</i> <input type="checkbox"/> Hold for Further Review <input type="checkbox"/> System Review/Submission <input type="checkbox"/> BOR Approval <input type="checkbox"/> THECB Approval/Notification <input type="checkbox"/> SACSCOC Approval/Notification
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Approved:       Reviewed:

*Michael K. Young*

7-5-16  
Date

RECEIVED

Texas A&M University

RECEIVED

New Certificate, Bachelors, Masters, or Doctoral Program

Undergraduate ♦ Graduate ♦ Professional

♦ Proposal Checklist ♦

SH APR 15 2016

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ESSAP

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

Requested by the Department or Unit of : ISEN

**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.) MS, MENG, PhD

Title of proposed program: Industrial Data Analytics

Proposed CIP Code (if known): 14 .3501 .00

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

Teach the fundamental knowledge and tools for analyzing various forms of data from industrial and manufacturing processes, including those for change and anomaly detection as well as experimental design and simulation purposes. Broad applications found in manufacturing quality control, process optimization in healthcare industry, error monitoring and security surveillance. Train students with key competences relevant to lean and six sigma.

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

Proposed program hours: 12 hours

\*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 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

100% Fall 2017 Approval Not Required (DL is already in place) 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 College Station, TX

Broadcast / TTVN \_\_\_\_\_

Specific off-campus location\*\*\* \_\_\_\_\_

Distance Education / Internet  In-State  Out-of-State Start Date Fall 2017

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

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

If no, explain or attach budget: \_\_\_\_\_

Will new costs for the first five years of the program be under \$2 million?

Yes

No

If new costs exceed \$2 million, coordinating board approval is required.

**Submitted by (Contact Person):**

Yu Ding

yuding@tamu.edu

Name

Email

Mike and Sugar Barnes Professor and Associate Dept. Head

979-459-2343

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.*

Signature, Department Head or Interdisciplinary Program Chair Date

Cesar O. Malave

*Typed or Printed Name*

*CS Malave for* 4/13/16

Chair, College Review Committee Date

*CS Malave for* 4/13/16

Dean of College Date

Chair, University Curriculum Committee or Graduate Council Date

Signature, Department Head or Interdisciplinary Program Chair (if joint program) Date

*Typed or Printed Name*

Chair, College Review Committee Date

Dean of College Date

*CS Malave* 05/06/16  
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 of Industrial Data Analytics

3. Proposed CIP Code:

14 .3501 .00

4. Brief Program Description – Describe the program and the educational objectives:

Teach the fundamental knowledge and tools for analyzing various forms of data from industrial and manufacturing processes, including those for change and anomaly detection as well as experimental design and simulation purposes. Broad applications found in manufacturing quality control, process optimization in healthcare industry, error monitoring and security surveillance. Train students with key competences relevant to lean and six sigma.

Number of Semester Credit Hours Required

12 credit hours.

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*):

*The Department of Industrial & Systems Engineering within the College of Engineering*

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

Fall 2017

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

about the program:

Name: Yu Ding

Title: Mike and Sugar Barnes Professor and Associate Department Head

E-mail: [yuding@tamu.edu](mailto:yuding@tamu.edu)

Phone: 979-458-2343

## 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.

The need was determined based on discussions with industry personnel and student interest. There is a significant interest among our current on-campus students who would like to be trained in industrial data analytics and receive a certification. The program will also be marketed to industry practitioners via face-to-face visits, telephone conversations, conference and workshop interactions and email exchanges. Data analytics courses are currently offered through Massive Online Open Courses (MOOC), other universities and statistics department and have very good demand. The proposed course focusses on data analytics from an industrial engineering perspective. In the long term all industrial engineering practitioners who want to learn and expand their skills to data analytics and using data driven analysis to facilitate improvement are target customers for this program.

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

On-campus students:

Short Term – 25 students per semester, or 50 per year;

Long Term – 50 student per semester, or 100 per year;

Distance students

Short Term – 3 to 5 per semester, or 10-15 per year;

Long Term – 5 to 15 per semester, or 15-45 per year.

- 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	50	50	75	75	100
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> )	0
Required Courses	12 hours
Prescribed Electives	0
Free Electives	0
Other ( <i>Specify, e.g., internships, clinical work</i> )	(if not included above)
TOTAL	12 hours

- 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.*)

Prefix and Number	Required Courses	SCH
ISEN 613	Engineering Data Analysis	3
ISEN 614	Advanced Quality Control	3
ISEN 616	Design and Analysis of Industrial Experiments	3
ISEN 625	Simulation Methods and Applications	3

Prefix and Number	Prescribed Elective Courses	SCH
	TOTAL SCH	12

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.)*

Name of <u>Core</u> Faculty and Faculty Rank	Highest Degree and Awarding Institution	Courses Assigned in Program	% Time Assigned To Program*
Amarnath Banerjee, Associate Professor	Ph.D. in Industrial Engineering; University of Illinois - Chicago	ISEN 625	10%
Satish Bukkapatnam, Professor	Ph.D. in Industrial Engineering; Penn State University	ISEN 613, ISEN 616	25%
Yu Ding, Professor	Ph.D. in Mechanical Engineering; Univ. of Michigan	ISEN 616; ISEN 614; ISEN 613	25%
Li Zeng, Assistant Professor	Ph.D. in Industrial Engineering; University of Wisconsin - Madison	ISEN 614; ISEN 613; ISEN 616	25%
Rich Feldman, Senior Professor	Ph.D. in Industrial Engineering; Northwestern University	ISEN 625	5%



<b>Name of Support Faculty and Faculty Rank</b>	<b>Highest Degree and Awarding Institution</b>	<b>Courses Assigned in Program</b>	<b>% Time Assigned To Program</b>
Ciriaco Valdez-Flores, Professor of Practice	Ph.D. in Industrial Engineering; Texas A&M University	ISEN 625	5%
Mike Graul; Adjunct Professor	Ph.D. in Industrial Engineering; Texas A&M University	ISEN 625	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.

There is a significant interest among our current on-campus students who would like to be trained in industrial data analytics and receive a certification. The program will also be marketed to industry practitioners via face-to-face visits, telephone conversations, conference and workshop interactions and email exchanges. Data analytics courses are currently offered through Massive Online Open Courses (MOOC), other universities and statistics department and have very good demand. The proposed course focusses on data analytics from an industrial engineering perspective. In the long term all industrial engineering practitioners who want to learn and expand their skills to data analytics and using data driven analysis to facilitate improvement are target customers for this program.

Prospective students will follow the normal ISEN degree program admission process. Once admitted, they will get this certificate, after meeting the certificate requirements.

We will aim for a diverse and dynamic student body. To achieve this goal, we will advertise the proposed certificate program through the department website, college website, ISEN distance learning website, brochures, and through our industry contacts and at Industrial Engineering conferences. In addition we will request all the department heads to assist in marketing the program on campus, and in the USA and internationally.

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.

Nothing special.

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.

Nothing extra.

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

No

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

The ISEN department will develop an appropriate annual or bi-annual review process to evaluate the impact of the certificate program. The review process will include evaluation of recruitment, curriculum, faculty, and student feedback. The review of the program will be conducted in a timely manner to assure assessment of prior performance and facilitate improvements.

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

ISEN department will administer the program.

### 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		Five-Year Funding	
Personnel <sup>1</sup> * (see note)	\$0	Reallocated Funds	\$0
Facilities and Equipment	\$0	Anticipated New Formula Funding <sup>3</sup>	\$0
Library, Supplies, and Materials	\$0	Special Item Funding	\$0
Other <sup>2</sup>	\$0	Other <sup>4</sup>	\$0
<b>Total Costs</b>	<b>\$0</b>	<b>Total Funding</b>	<b>\$0</b>

\*Note: No extra cost is anticipated because these courses are already taught as part of ISEN graduate degree program. No new hiring is needed either.

1. Report costs for new faculty hires, graduate assistants, and technical support personnel. For new faculty, prorate individual salaries as a percentage of the time assigned to the program. If existing faculty will contribute to program, include costs necessary to maintain existing programs (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).
2. Specify other costs here (e.g., administrative costs, travel).
3. Indicate formula funding for students new to the institution because of the program; formula funding should be included only for years three through five of the program and should reflect enrollment projections for years three through five.
4. Report other sources of funding here. In-hand grants, "likely" future grants, and designated tuition and fees can be included.

## 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

