A Proposal of BS/BT Degree Major in Industrial Engineering Technology with New York State Teacher's Certificate for Teaching Vocational/Technology Education in Secondary Schools

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Abstract:

The rapid advancement of technology has helped to put US economy at new highs for more than eight years in a row. This "new economy" has generated an urgent shortage in the United States for competent scientists, engineers, technologists as well as certified teachers who teach and train them. This paper proposes a BS/BT degree major in Industrial Engineering Technology that will provide IET students at SUNYIT (State University of New York Institute of Technology) with an option to teach vocational/technology education at secondary schools in the State of New York.

I. Introduction

Electronic computer were introduced less than sixty years ago. With our never ending desire for more powerful applications, computer technology and its applications industries will continue searching for better hardware and software – including application software in the areas of industrial, manufacturing, and quality engineering technology. In addition to traditional Computer Aided Design (CAD) courses, currently more and more high schools are adding new courses such as Computer Aided Manufacturing (CAM) and Robotics/Automation into their technology curriculum. New York State Vocational Schools, namely BOCES (Board of Cooperative Educational Services) schools, are doing the same. Some school districts have even introduced technology awareness courses as early as fourth grade. This general trend has created an enormous demand for Certified VocEd/Technology teachers with deeper and broader knowledge of technology. The curriculum of Industrial Engineering Technology program at State University of New York Institute of Technology (SUNYIT) has more than enough technical courses for the preparation of teacher's certification in VocEd or Technology. Only the education courses needed to be included for that purpose.

II. IET curriculum at SUNYIT

SUNYIT is an upper division Institute for transfer and graduate studies. Students who complete their first two years of study may transfer up to 64 credits into our program. IET program requires a minimum of 128 total semester credits to graduate for a BS or a BT degree. Required core courses in the IET major for BS or BT track are the same:

ITC320	Application Project I	(2 cr.)
ITC321	Application Project II	(2 cr.)

ITC311	Manufacturing Operations	(4cr.)
ITC327	Production and Operation Management	(4cr.)
ITC358	Plant Layout and Material Handling	(4cr.)
ITC362	Computer Aided Design	(4cr.)
ITC373	Statistical Quality Control	(4cr.)
ITC462	Computer Aided Manufacturing	(4cr.)
ITC475	Economics Analysis in Technology	(4cr.)
ITC483	Quality Improvement	(4cr.)
Total		36cr.

Upon approval, students may transfer some equivalent lower division courses (such as ITC311 and ITC362) to fulfill part of the core requirement. Students also have to take or to transfer in additional technical (engineering technology) credits in order to meet the minimum ABET requirement --- 54 semester credit.

Arts and Sciences course requirement:

One Oral Communication course
One (upper division) Technical Writing Course
English I & II
Two Humanity courses
Two Social Science courses
One liberal arts elective course
Additional elective arts/science courses as needed
(Minimum ABET and New York State requirement – 34 credits for BS degree.
Minimum ABET and New York State requirement – 24 credits for BT degree.)

Mathematics and Science requirement:

One Physics with lab course
One Basic Science with lab course
Calculus I & II
One mathematics elective course (prefer Statistics)
One Computer Programming course
Additional elective Math/Science courses as needed
(Minimum ABET and New York State requirement – 26 credits for both BS and BT degrees.)

Open Electives:

14 credits for BS degree
24 credits for BT degree

III. New York State Requirements for Provisional Certification:

1. BS or BT degree in Engineering Technology (offered at SUNYIT)
2. Twelve semester hours of Teacher Education course
   (offered by SUNY Oswego in Syracuse area):
   - VTP 500 Contemporary Concepts in Voc-Tech Education

- VTP 504 Instructional Resources Development
- VTP 580 Curriculum Development in Voc-Tech Education
- VTP 582 Instructional Methods and Evaluation

3. Supervised Teaching Internship (available at Utica/Rome, NY area)
4. Child Abuse Seminar (included in Vocational Courses)
5. NY State Teacher Certification Examinations (LAST and ATS-W)
6. One year of work experience in related to the area of certification (required to those seeking Vocational Certification)

For the Permanent Certification additional requirements are:

1. Completion of a Master Degree
2. Two years of Teaching experience
3. Approval of a video taped lesson

IV. The proposed change (for NYS Teacher's Certification Option)

As shown in section II, the open electives for IET curriculum has a room of either 14 credit hours for MS degree or a room of 24 credit hours for BT degree. It has been suggested that we should use those for putting VTP courses as requirement for this option. Obviously, the BT degree track has more room (24 credit hours than the BS track (only 14 credit hours). This would make the BT track more flexible and may be more attractive compared to the BS track. Since the permanent teacher' certificate of New York State requires a master degree, students have a choice either to take the newly added VTP courses as undergraduate credits for completing the BS/BT degree or to complete the old BS/BT degree track with IET major as usual and then take VTP courses as graduate credits towards MSAT degree (Master of Science in Advanced Technology) at SUNYIT. If a student chose the graduate option, then he/she can take additional six graduate core courses and complete a graduate project (MST690) from SUNYIT's MSAT program for his/her MS degree in Engineering Technology.

V. Advantages for this new option

1. Provide additional option for students who are seeking stable career environment such as secondary school teachers.
2. Provide additional option for students who are seeking reasonable and steady income for their career.
3. Provide credentials either to work in industry or in secondary school system.
4. Provide graduates with the opportunity to teach at community or technical colleges upon completion of the MSAT degree or its equivalent in engineering technology or engineering.

VI. Conclusion

Due to the competition from the private industries as well as government sectors, statewide shortage of qualified VocEd/Technology teachers has been created a while ago. We, the faculty of IET program at SUNYIT and the faculty of VocEd program at SUNY Oswego feel that there is an opportunity to provide our students the ways and tools to fulfill this statewide demand and to give additional choice in their career. This is the first time initiative of this kind in the State of New York. At this point we are soliciting suggestions in order to improve our proposal. This paper serves as the starting point. Inputs of any kind will be appreciated.

Acknowledgement

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Biography

Orlando Baiocchi is the dean and professor of School of Information Science and Engineering Technology at the State University of New York Institute of Technology, Utica, NY. He holds a Ph.D. degree in electrical engineering from the University of London, UK.

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