

AC 2008-1991: A NEW BACHELORS'S PROGRAM IN MOTORSPORTS TECHNOLOGY

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A NEW BACHELORS'S PROGRAM IN MOTORSPORTS TECHNOLOGY

Abstract

At the 2007 ASEE Conference the author described a BS program in Motorsports Technology being developed by Old Dominion University (ODU). The program was being developed to be delivered on-site in Martinsville, VA in conjunction with Patrick Henry Community College (PHCC) who offers a complimentary associate degree program and the recently established New College Institute (NCI) in Martinsville. The paper reported the progress of the development stage. This paper presents the progress made toward offering of the program in the Martinsville site. The promised funding was achieved and a contract signed the spring of 2007 between Old Dominion University and the New College Institute. A search was performed and a program coordinator was hired in the summer of 2007, who is now on site in Martinsville. These first few months the coordinator has been working with the ODU Department of Engineering Technology chair, the Dean of Applied Science and Engineering Technology at Patrick Henry Community College and the director of the New College Institute on establishing an office at PHCC and in establishing a strategic marketing plan to advertise the program and recruit students for courses beginning in the Spring 2008 semester. The curriculum and articulation with PHCC are being more finely tuned, as well as articulation with other associate degree engineering technology programs for entry into the upper level program offered by ODU. This paper will present the progress made in establishing the program, developing marketing tools, and articulating the program with other associate degree programs.

Introduction

Experts in motorsports agree that the golden age of national and international auto racing is right now ¹. The Motorsports industry has reached an unprecedented level of technical sophistication that brings well remunerated jobs to professionals with knowledge and skill in the field. The technology behind motorsports is at the vanguard of vehicle design, manufacture, and testing. In fact, motorsports carries the prestige of national and international vehicle manufacturers, makes, and models. Motorsports also attracts sponsors, and countless business and technical opportunities to localities.

Old Dominion University (ODU), Norfolk, VA, the New College Institute (NCI), Martinsville, VA) and Patrick Henry Community College (PHCC), Martinsville, VA have partnered to offer Motorsports Engineering Technology in Martinsville, VA. This partnership aims at facilitating educational aspirations of students, professionals, and companies involved in the motorsports industry locally, state, and nationwide.

The area of Martinsville is unique for motorsports. Many consider Martinsville and surrounding counties the “*Motorsports Alley*” of Virginia. State-of-the-art motorsports laboratories and auto race facilities in the area of Martinsville allow schools to deliver quality engineering instruction and training to students.

The motorsports industry is currently in need of specialized professionals in high-performance vehicle technology. In response, Old Dominion University in cooperation with other institutions of higher learning, has implemented and continues to implement ad-hoc infrastructure, and laboratories in the area of Martinsville. This infrastructure is being used for engineering education, and cutting-edge research in motorsports. The implementation of a bachelor's program in Motorsports Technology at Martinsville is part of ODU efforts to prepare engineering professionals with expertise in the technology behind Motorsports².

At the writing of this paper, funding has been achieved to establish and initiate the Motorsports Technology bachelor's program in Martinsville, VA. A program director has been hired to coordinate the implementation of the program. The director is in charge of developing curricula, articulation, and marketing strategies to recruit students into the program. Aggressive recruiting efforts are being conducted in close cooperation with the New College Institute and Patrick Henry Community College. As a result, the program director has reported a considerable number of inquiries from potential students from across the nation.

Recruitment efforts include visits to regional community colleges and high schools, and informational sessions at NCI headquarters. These efforts also involve the development of internet-based information, direct contacts with PHCC students and graduates, mail advertisement, and "booth" advertisement in motorsports-related events such as the Martinsville NASCAR 500 race, and the Performance Racing Industry Trade Show in Orlando, FL.

Initial enrollment in the Motorsports Technology program is low, as expected. Nevertheless, the bachelor's program in Martinsville began in the Spring 2008 semester as originally planned and is underway.

Program Requirements

The bachelor's program in Motorsports Technology is quite flexible. It requires 76 "lower-division credits" and 45 "upper-division credits", totaling 121 credits. Most of the lower-division credits can be completed at a local state or private college of the student's choice. The upper-division credits are delivered by ODU and facilitated by NCI at Martinsville, VA. Ideally, these 45 "upper-division" credits could be completed by students in three academic semesters.

Upon completion of the program, students receive a Bachelor of Science in Engineering Technology with expertise in Motorsports.

Table 1 explains the course and credit requirements for the program. In order to enroll in the Motorsports Technology bachelor's program students are required to complete "lower-division" credits in mathematics, oral and written communication, natural science, perspectives in humanities and social science, and what are referred to as "technical content" credits. These "technical content" courses are all related to Motorsports Technology.

TABLE 1

Lower and upper division requirements for Motorsports Engineering Technology



BACHELOR OF SCIENCE IN ENGINEERING TECHNOLOGY (B.S.E.T)
MOTORSPORTS TECHNOLOGY

LOWER-DIVISION CREDITS

Most credits can be completed at a local State or Private College ⁽¹⁾

ODU courses		Credits
	Oral and Written Communication	9
ENGL 110C	English Composition	3
ENGL 131C	Technical & Scientific writing	3
COMM 101R	Public Speaking	3
	Mathematics	10
MATH 162M	Pre-Calculus I	3
MATH 163	Pre-Calculus II	3
MATH 211	Calculus I	4
	Natural Science	12
PHYS 111N	General Physics I with Lab	4
PHYS 112N	General Physics II with Lab	4
CHEM 115N	Foundations of Chemistry with Lab	4
	Humanities and Social Sciences	15
*	Literature Perspective (L)	3
*	History Perspective (H)	3
*	Philosophy Perspective (P)	3
*	Fine Arts (F)	3
*	Social Science (S)	3
	Technical Content	30
MET240	Engineering Graphics and CAD	3
**	Technical Base (Motorsports)	18
**	Technical Electives	9
	TOTAL CREDITS LOWER DIVISION	76

UPPER-DIVISION CREDITS

Courses are delivered by ODU in Martinsville, VA

ODU courses		Credits
	Technical Content including Electives	33
MET 300	Thermodynamics	3
MET 305	Principles of Mechanics	3
MET 335	Fluid Mechanics	3
MET 335	Fluid Mechanics Lab	1
MET 350	Thermal Applications	3
MET 387	Power & Energy Laboratory	2
AE 407	Ground Vehicle Aerodynamics	3
AE 457	Vehicle Dynamics	3
AE 467	Race Car Performance	3
AE 477	High Performance Piston Engines	3
MET 435	Senior Project	3
	Technical Elective	3
	Minor	12
ENMA 301	Engineering Management	3
ENMA 302	Engineering Economics	3
ENMA 401	Project Management	3
ENMA 420	Statistics	3
	TOTAL CREDITS UPPER DIVISION	45

TOTAL CREDIT HOURS REQUIRED TO COMPLETE THE B.S.E.T. PROGRAM IN
MOTORSPORTS TECHNOLOGY **121**

(1) Course equivalency and transferability must be consulted with ODU's Director of Motorsports Program at motorsports@newcollegeinstitute.org.

* Consult with ODU's Director of Motorsports Program at e-mail address above.

** Technical Base credits should include courses heavily related to motorsports including, manufacturing processes, materials science including lab, analysis of structures, quality control, metrology, instrumentation, internal combustion engine analysis and testing, vehicle electric system with laboratory, electronics with lab, computer control and automation, materials manufacturing, and engineering problems solution. For transferable credits, consult with ODU's Motorsports Program Director sending questions to e-mail address above.

With the exception of the lower level “technical content” courses, most colleges in the US offer courses that are compatible and are transferable to ODU’s Motorsports Technology program. Furthermore, course-transferability can be easily examined by accessing the University’s “Monarch TRANSFERmation” system³.

Irrespective of the student’s residence in the US, he/she can start the completion of credits following the requirements shown in the table and checking the transferability of the courses into the program. Transferability can also be checked via the internet with the program director at Martinsville⁴.

Motorsports “Technical Content” Credits

Because engineering or technology programs in Motorsports are quite unique, very few colleges offer most “technical content” courses as required by the bachelor’s program. ODU partners with Patrick Henry Community College to make those courses available to students in Martinsville. These are courses heavily related to the Motorsports field, and with substantial hands-on activity in special laboratories. These laboratories have been built specifically for Motorsports Technology instruction. Motorsports-related courses should not be confused with Automotive-related courses. Very few colleges or institutes in the US have such laboratories. For this reason, students are encouraged to enroll at PHCC in order to complete seamlessly the lower level technical content credit requirements. There are also plans to articulate with other programs at community colleges such as Mechanical Engineering Technology, Computer-Aided Drafting, etc., for entry into the bachelor’s degree program with some bridge courses from PHCC.

Upper-Division Credits

Upper-division courses are delivered by ODU in Martinsville, VA. These courses stress engineering analysis and laboratory practice. Most lectures are delivered live-on-site in classrooms at NCI and PHCC. The state-of-the-art classroom facilities in Martinsville also allow lecture-classes to be delivered via video-conferencing. Arrangements can be made to provide this service outside Martinsville, statewide or nationwide.

Laboratory practice, however, is performed at “real-life” facilities such as, the Virginia International Raceway, which houses a driving simulator, vehicle dynamics rig, chassis dynamometer, and engine instrumentation laboratories in Danville, Virginia, about 40 miles from Martinsville. Other unique facilities include the Langley Full-Scale Wind Tunnel in Hampton, Virginia, operated by ODU, and the Virginia Motorsports Technology Center at PHCC.

Program Alternatives

Students have several alternatives. For example, they can enroll in a course of study at a local college, and start the completion of lower-division credit-requirements. They can concentrate particularly on completing credits related to mathematics, oral and written communication, and natural science.

It is also possible to apply for undergraduate admission into ODU as a transfer student, and take upper level courses in Norfolk, VA, or through the TELETECHNET distance learning system if available in the student’s geographical location. Students would have to obtain the lower level technical content at PHCC or some other institution.

The preferred alternative would be to enroll at PHCC and complete all lower-division requirements there, including the lower level “technical content” courses.

Many students interested in the Motorsports Technology Program already may have a majority of lower-division credits completed. This applies particularly to students that are currently

enrolled in Mechanical Engineering Technology programs or other related fields. These students may be able to enroll into the Motorsports Technology program in Martinsville, VA, take lower level “technical content” bridge courses at PHCC and complete the program with ODU’s upper level courses.

In any case, for a student interested in the technology behind Motorsports, the Motorsports Technology program in Martinsville will prepare him/her for a gratifying career that involves high performance engines, intrepidly aerodynamic and sporty vehicles, fast race cars, and exciting auto race events.

The ODU - PHCC Partnership and Close Involvement.

PHCC and ODU from start were de-facto close partners in the implementation of the Motorsports Technology program. In effect, the bachelor’s program builds on the Associate Degree program in Motorsports Technology offered by PHCC. Serious efforts have been made to establish a close coordination between the academic requirements of both programs. A coordinated articulation will allow a seamless and efficient transfer of graduates from PHCC into the bachelor’s program.

An important initial step, prior to an articulation agreement, has been the clarification of goals and outcomes of the associate degree program for PHCC in order to secure compatibility and transferability. Table 2 shows the program outcomes developed by the program faculty at PHCC. At the writing of this paper, a suitable approach to achieve and measure the proposed outcomes is under development.

The need for a well-defined program of study in Motorsports Technology offered by PHCC to those students interested in transferring into the bachelors program has been identified. The requirements of the current associate degree program in Motorsports Technology at PHCC only partially fulfill the lower-division requirements of the bachelor’s completion program. This is matter of concern for students interested in completing the baccalaureate degree. Therefore, additional efforts are in place to structure a Motorsports Technology associate degree program at PHCC that would more effectively satisfy those requirements.

TABLE 2

PHCC Motorsports Program

Program Outcomes as per ODU requirements

1. Students shall demonstrate knowledge about auto racing and race vehicles, their characteristics, specifications, rules, regulations, systems, current technology, and testing methods.
2. Students shall demonstrate critical thinking skills and the ability to apply mathematical and scientific *knowledge and* reasoning skills in solving *technical* problems.
3. Students shall demonstrate knowledge about components, systems, configuration, classification, terminology, and principles of functioning of high performance engines used in race competitions.
4. Students shall demonstrate the ability to assemble, test, and apply corrective methods to resolve technical issues related to maximum power performance of race engines using codes and specifications.
5. Students shall demonstrate the knowledge of aerodynamics, stability, and control of race vehicles, and the ability to design, model, and fabricate structures and bodies of race vehicles using blueprints and safety specifications.
6. Students shall demonstrate knowledge of engineering materials, manufacturing processes, and testing techniques, and skill to conceive fabricate and/or assemble suspension, traction, steering and braking systems of race vehicles.
7. Students shall demonstrate understanding and application of information technology and general business knowledge, and their applicability to the motorsports industry.
8. Student will be able to describe contemporary approaches to management and demonstrate management and marketing skills relevant to the motorsports industry.
9. Students shall demonstrate effective verbal, oral and written communication skills applicable in a business setting.
10. Student will demonstrate acceptable ethical behaviors and interpersonal skills that reflect an understanding of diversity and teamwork

The ODU - NCI Partnership and Common Goals

From its inception, the mandate of the New College Institute (NCI) has been to respond to the educational needs of the City of Martinsville, and its surrounding counties⁵. NCI has

aggressively pursued partnerships with several Virginia Colleges and Universities willing to invest in the educational development of the region and implement academic programs of special interest. One of these programs is ODU's Motorsports Technology baccalaureate program.

Program facilitation, advertisement and personnel support have been the priority of NCI for all its partner schools. NCI has been instrumental in initiating the advertisement campaign for the Motorsports Technology program locally and state wide through newspapers, bill boards, and television. ODU's Motorsports Technology program director and NCI have cooperated to develop and publish a brochure⁶ for distribution in meetings, conferences, and information sessions. Reception of such information and advertisement has been quite positive. At the writing of this paper, enrollment projections for the Fall 2008 semester are encouraging.

Summary

A bachelor's level degree program in Motorsports Technology has been developed by Old Dominion University for initial on-site delivery in Martinsville, VA. Important partners for this program are Patrick Henry Community College and the New College Institute, both located in Martinsville, VA. Courses were initiated in Spring 2008 with small enrollment. A strong marketing effort has been initiated by the ODU Motorsports Technology program director and our partner institutions to attract local, regional and national students. Expectations are that the program will grow substantially by Fall 2008 and in the future.

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