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ABSTRACT

The Tech Prep West Project, established in 1991, brought together three Massachusetts community colleges, seven secondary vocational schools, and one comprehensive high school to develop an alternative college preparation pathway for students, leading from the junior year of high school to an associate degree and employment in a specific career field. Key components of the program included: (1) tech-prep specialists at each site to direct program planning and implementation; (2) collaborative curriculum development; (3) joint staff development for faculty and counselors; (4) tech prep leaders in each school to enlist students and ensure institutionalization of program objectives; (5) curricular materials to support applied academics instruction; (6) a tech prep outreach counselor to promote the program in middle schools and high schools; and (7) tech prep clubs and other strategies to support and nurture student involvement. Members of the Tech Prep West Business and Industry Council review, modify, and validate program goals and curricula, as well as contributing time, staff, and work-experience opportunities. Over 70 articulation agreements between schools and colleges, affording credit in 25 career areas, provide incentives for student participation. The project report includes outlines of the Voc-Tech and Career Cluster curricular options from grades 6-8 to grades 13-14, with possible exit points after high school and community college graduation; a list of the key features of the Tech Prep West model; information on the target population and curriculum; an overview of curricular changes between 1991 and 1995 in each of eight schools; and outlines of four sample curricula. (KP)

TECHPREP

WEST

The Massachusetts TECH PREP WEST Model

Springfield Technical Community College
Holyoke Community College
Greenfield Community College

The **TECH PREP WEST Project**, established in 1991, brought together three community colleges, seven secondary vocational-technical schools, and one comprehensive high school to develop an alternative College Prep pathway for students, leading from the Junior year of high school to an Associate Degree and employment in a specific career field. As a comprehensive system of career education and training, the program involves: a) early awareness on the part of students, parents, teachers and staff of an array of mid-level technical career options; b) delineation of a program of academic and technical education designed to lead to them; and c) special supports and services to ensure successful participation and completion of such programs by the widest range of students possible.

Key components of the program include: Tech Prep Specialists at each of the three colleges to direct program planning and implementation; collaborative (secondary/postsecondary) curriculum development; joint staff development for faculty and counselors; Tech Prep Leaders in each school to enlist students and ensure institutionalization of program objectives; curricular materials to support applied academics instruction; a Tech Prep outreach counselor to promote the program in middle schools and high schools; and "Tech Prep Clubs," as well as other strategies to support and nurture student involvement.

Members of the Tech Prep West Business and Industry Council review, modify, and validate program goals and curricula, as well as contributing time, staff, and work-experience opportunities to support participating students. Over 70 articulation agreements between schools and colleges, affording credit in 25 different career areas, provide incentives for student participation. Eleventh and twelfth grade curricula developed by secondary/postsecondary faculty committees has been implemented in schools throughout the consortium; new approaches and courses to complement secondary changes are being established at the postsecondary level this year.

Each year, Springfield Technical Community College designs a Tech Prep Summer Institute in Advanced Technical Training for area secondary faculty. "In HIGH-TECH FOR KnoW TECH," our most recent offering, academic faculty and guidance counselors received an introduction to careers in Health as well as the Engineering Technologies, and participated in hands-on activities demonstrating what their students will need to know as technicians in a 21st century workplace. Afternoon workshops facilitated by local experts offered strategies for integrating academic and technical instruction in such a way that they mutually reinforce each other, without compromising the rigor and scope of either.

In this--the fourth--year of our project, the program has entered a new phase. Six additional comprehensive high schools have signed on to the project, their interest prompted by the Massachusetts Education Reform Act of 1993, as well as School to Work Opportunities Act

funding slated for the region*[1] . These schools will be exploring a "Career Cluster" model of Tech Prep--a model less occupationally-specific at the secondary level, but with the same potential outcome--an Associate Degree in a technical field at the end of four years.

In many ways, we are starting over in terms of Tech Prep development, as we begin anew the process of winning over administrators to the concept, overcoming faculty resistance and "turf" issues, and reducing skepticism among guidance and other staff. However, this time around we are aided in that endeavor by two key parties: faculty from Phase I schools who have become champions of a curriculum they designed and can personally vouch for; and students whose successful transition--from school-to-college and, increasingly, from school-to-work--is the best testimony to the program's effectiveness.

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[1]*Massachusetts was one of eight states receiving a three-year School-to-Work Implementation grant from federal authorities last spring.

TECHPREP WEST

The Massachusetts TECH PREP WEST Model

Voc-Tech Option

Grades 6 - 8	Career Awareness of Mid-level Voc-Tech Careers
Grade 9	Vocational-Technical Exploratory Program and Enrollment in TECH PREP Preparatory Courses
Grade 10	Enrollment in Vocational-Technical Program of Choice, such as: Drafting Machining Electrical Electronics Automotive Graphic Arts HVAC Horticulture Business Construction Health Assistant Cosmetology Computer Science Culinary Arts Data Processing
Grades 11 & 12	TECH PREP CURRICULA Academic Core: TECH PREP Science, Math, and English Vocational-Technical Core: Average 15 hours per week in Voc-Tech Schools/Labs HIGH SCHOOL DIPLOMA AND CERTIFICATE OF COMPETENCY IN VOCATIONAL-TECHNICAL AREA
EXIT POINT I	**EMPLOYMENT** in occupations such as: data entry clerk, cook, health assistant, electrical apprenticeship, cosmetologist, etc.
Grades 13 & 14	**Community College Career Program** (Often with advanced standing in voc-tech areas) in fields such as: Mechanical Technology Small Business Management Electronics Computer Maintenance Bio-Medical Instrumentation Computer Information Systems Ford ASSET Program Energy Systems Electrical/Robotics Production Management Graphic Arts Hospitality Management Landscape/Plant Science Cosmetology Management Data Processing Early Childhood Industrial Technology Civil Engineering Technology Medical Assistant ASSOCIATE DEGREE OR TWO-YEAR CERTIFICATE
EXIT POINT II	**EMPLOYMENT** in occupations such as: electronics field service technician, automotive technician, engineering aide, bio-medical instrumentation technician, graphic artist, printing manager, manufacturing supervisor, small business owner, junior mechanical engineer, industrial automation specialist, restaurant manager, etc.

TECHPREP WEST

The Massachusetts TECH PREP WEST Model

Career Cluster Option PROPOSED

Grades 6 - 8	Career Awareness of Mid-level Technical Careers
Grades 9 - 10	Enrollment in TECH PREP Preparatory Courses: Math, English, Science, Career Awareness/Assessment via College Outreach Activities
Grades 11 & 12	**TECH PREP CURRICULA** **Academic Core:** TECH PREP Science, Math, and English **Career Cluster Core:** average 4-7 hours per week in Business, Health, Technology courses, i.e., Accounting, Intro to Business, Health Career Seminar, Computer Science, Drafting, Electronics, etc. **HIGH SCHOOL DIPLOMA AND CERTIFICATE OF COMPETENCY IN CAREER CLUSTER AREA**
EXIT POINT I	Stronger academic skills and more focused career goals increase chance of employment should students decide to leave program after Grade 12.
Grades 13 & 14	**Community College Career Program** (Often with advanced standing) in fields such as: Mechanical Engineering Technology Small Business Management Electronics Computer Maintenance Bio-Medical Instrumentation Computer Information Systems Ford ASSET Program Energy Systems Electrical/Robotics Production Management Graphic Arts Hospitality Management Landscape/Plant Science Cosmetology Management Data Processing Early Childhood Industrial Technology Civil Engineering Technology Medical Assistant and a dozen other Allied Health areas **ASSOCIATE DEGREE OR TWO-YEAR CERTIFICATE**
EXIT POINT II	**EMPLOYMENT** in occupations such as: electronics field service technician, automotive technician, engineering aide, bio-medical instrumentation technician, graphic artist, printing manager, manufacturing supervisor, small business owner, junior mechanical engineer, industrial automation specialist, occupational therapy assistant, diagnostic medical sonographer, etc.

Key Features of the TECH PREP WEST Model

* Over 600 area students enrolled in classes jointly developed by secondary and postsecondary faculty, approved by industry representatives, and specially designed to encourage successful student transition into Associate Degree career training.

* Over 70 articulation agreements leading to Associate Degrees in 25 different career areas.

* Many agreements provide for not only credit, but also annual presentation by professor, campus visits, jointly developed challenge exams, and other mutually beneficial collaborations.

* Three colleges, eight partner secondary schools: Tech Prep should expand student options, not narrow them.

* Multiple exit/re-entry points, enabling students to enter workplace with competitive skills, permanently or temporarily.

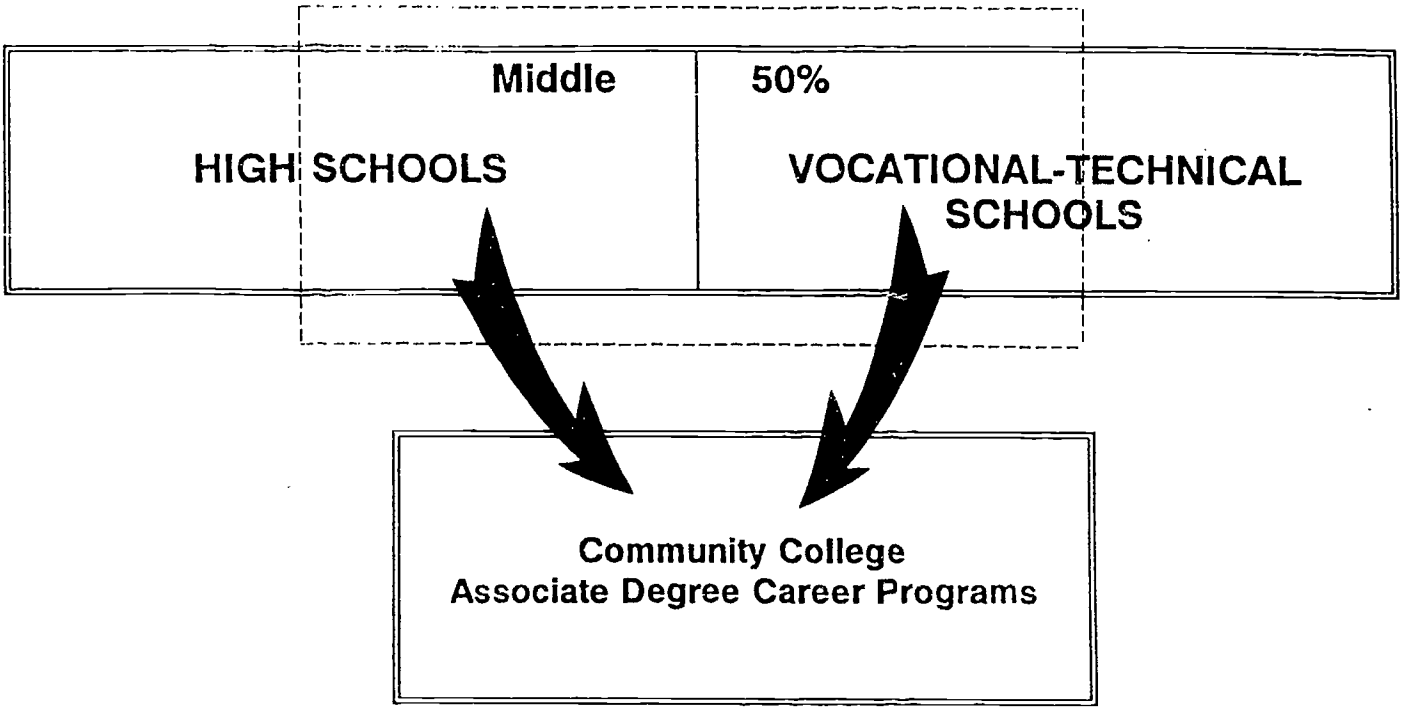
* Continuation of intensive voc-tech education at the secondary level in order to retain and well-train students unable or unwilling to pursue higher education immediately.

* Use of the pyramid (rather than staircase) model to educate for technical careers: raise the achievement and employability levels of a broader range of students, rather than fine-tune the higher end of the curriculum for a few.

* Tech Prep, not traditional College Prep: there is a difference!

* Collaboration and staff training that lays the groundwork for even more ambitious projects: integrated/interdisciplinary curricula at both levels and comprehensive work-based learning/youth apprenticeship development.

TECH PREP
TARGET POPULATION



TECH PREP MEANS...

- preparation for the estimated 80% of new jobs that will require some form of postsecondary training;
- a four-year curriculum, from the junior year in high school through the second year of college, with a minimum of duplication or gaps in the instructional sequence;
- students well prepared in communications, math, science, and vocational-technical areas for specific career programs at Springfield Technical, Greenfield, and Holyoke Community Colleges;
- Associate Degrees and technician status in the workplace;
- the opportunity to earn college credits for some courses while still in high school;
- enhanced college/career counseling services;
- secondary schools and community colleges working in partnership to develop highly skilled technicians with the ability to adapt and ADVANCE in a rapidly changing workplace.

TECH PREP CURRICULUM

How Is It Different?

- competency based
- hands on
- emphasis on workplace application of academic skills
- jointly developed by secondary and postsecondary faculty to ensure a logical sequence and smooth transition for students
- reviewed by the Tech Prep Business and Industry Council to verify workplace relevance and incorporate local employer ideas.
- not just more courses, but better courses--with innovative approaches that recognize different learning styles

TECH PREP COMMUNICATIONS

Recommended Curriculum: A portfolio-driven curriculum requiring the development of competencies in speaking, listening, and critical thinking as well as reading and writing. Assignments include shop-related journals, business correspondence, technical reports, and readings in technical journals and manuals as well as literature. Recognition of the fact that the development of communications competencies can and should occur in many places besides the English classroom.

TECH PREP SCIENCE

Recommended Curriculum (Year I & II): Units 1-7 of the Center for Occupational Research and Development's PRINCIPLES OF TECHNOLOGY (PT), a nationally acclaimed applied physics course specifically designed to be both academically rigorous and practical for students planning technical careers. Each of the units deals with one principle (Work, Rate, Energy, Power et al.) as it applies in the four energy systems-mechanical, fluid, thermal, and electrical-that make up both simple and complex technological equipment. Applied Biology/Chemistry (ABC), also developed by CORD, integrates biology and chemistry into a unified subject. Not designed to take the place of College Prep biology or chemistry courses; however, incorporation of relevant modules into existing science can increase the capacity of a traditional course to engage students with different learning styles.

TECH PREP MATH

Recommended Curriculum (Year I, II, & III): A modified version of CORD's Applied Math II curriculum, addressing the following topics: Solving Problems That Involve Linear Equations, Graphing Data, Solving Problems That Involve Nonlinear Equations, Working with Statistics and Probabilities, Factoring, Patterns, and Functions, Quadratics, Systems of Linear Equations in Two Variables, and Inequalities, Geometry in the workplace, and Working with Right Triangles. Each unit contains a video that relates the topic to the world of work, three hands-on lab activities that require measurement, calculation, and interpretation of results, and 40 word problems that require the use of scientific calculators.

TECH PREP IMPACT
Measured in Terms of Curriculum Change
1991-1995

School 1

	September 1991	January 1995
Math	General Math; Coll. Prep. Algebra.	New texts purchased and math curriculum redesigned with Tech Prep focus.
English	Traditional offerings except for one portfolio-driven, workshop-based section.	Tech Prep portfolio system expanded to all English classes; English Comp. replaced by Communications in the Workplace.
Science	Only 9th grade physical science and "related" science instruction.	P.T. pilot implemented; Applied Bio-Chem infused.
Articulations	2 credit articulations	5 credit articulations

School 2

	September 1991	January 1995
Math	Several levels (from general to college prep) but few with with Tech Prep focus/intensity.	TP Math I & II fully implemented; also pre-TP math course.
English	Applied Communications curriculum and portfolio system in development.	Continuing.
Science	Various offerings, including physics--with, however, a traditionally academic focus/ sequence.	Physics instructor retrained in P.T. approach; P.T. implemented.
Articulations	9 credit articulations	12 credit articulations

School 3

	September 1991	January 1995
Math	Several levels (from gen/voc to college prep); however, none with TP focus.	General math eliminated; four sections pre-TP math for 10th grade implemented. TP Math I implemented for 11th grade & TP Math II for 12th grade. Exit exam and placement into College Tech Prep Bridge course slated for June 1995.
English	Standard offerings.	Portfolio system with applied communications activities being developed.
Science	Various offerings, including physics with, however, lecture-based, academic format.	Schedule restructured to allow 80-minute blocks for P.T. program; implemented Fall '93. Developing Applied Bio-Chem.
Articulations	10 credit articulations	13 credit articulations

School 4

	September 1991	January 1995
Math	Several levels; however, none w/ TP focus; moreover, most college prep math closed to voc. students due to schedule conflicts.	TP Math I implemented; TP Math II being explored.
English	Highly traditional offerings.	Applied communications implemented for Seniors; portfolio approach in process.
Science	Fully implemented P.T. program;	Applied Bio-Chem being explored.
Articulations	11 credit articulations.	12 credit articulations.
Serious division between academic/vocational departments.		TP integration efforts have resulted in several working committees of mixed Acad/voc. faculty and administration working on behalf of voc students.

School 5

	September 1991	January 1995
Math	General math; no math beyond Algebra I.	General math eliminated; more advanced math required of all students.
English	Standard offerings.	Ambitious applied communications curriculum integrating English and voc-tech developed and implemented.
Science	Only 9th grade physical science and "related."	Applied Bio/Chem course implemented; P.T. pilot planned.
Articulation	3 credit articulations.	4 credit articulations.

School 6

	September 1991	September 1995
Math	Several levels (voc to college prep), but few or none w/ TP focus/intensity.	Vocational math eliminated; replaced by pre-Tech math. Two sections TP Math I implemented.
English	Traditional offerings.	Portfolio-driven TP communications course begun for Juniors and Seniors; integrating English with voc-tech program.
Science	Various offerings including physics with, however, traditional focus.	P.T. and Applied Bio/Chem courses launched.
Articulations	6 credit articulations.	10 credit articulations.

School 7

	September 1991	January 1995
Math	Vocational math only.	Pre-tech Prep math implemented; TP Math I section planned.
English	Technical communications curriculum.	Portfolio system implemented; curriculum widely integrated with voc-tech shops.
Science	Related science only.	Preparatory applied science course implemented for 9th grade; Applied Bio-Chem and P.T. being infused Fall 1994 and 1995.
Articulations	0 credit articulations	3 credit articulations
Little communication/interaction between acad/voc wings; almost no access by voc. students to academic courses.		Major restructuring of school allows for increased interaction of academic and technical faculty and increased access by voc. students to academic courses.
Traditional 9th grade exploratory program.		Exploratory developed into full-scale TECH ONE.

School 8

	September 1991	January 1995
Math	Fully implemented CORD Applied Math program.	Instructor used as a consultant for new applied math program.
English	Traditional offerings.	Applied communications portfolio being developed by SPED teacher; bridge Tech Prep Applied Communications course for adult students developed by same instructor.
Science	Fully implemented P.T. program.	Instructor used as a consultant/trainer for developing P.T. programs.
Articulations	4 credit articulations	7 credit articulations

SAMPLE TECH PREP CURRICULUM: Bio-Medical Instrumentation Technology

Putnam		Springfield Technical Community College	
Junior Year	**Senior Year**	**Freshman Year**	**Senior Year**
Tech Prep Commun. I	Tech Prep Communications II	Eng. Comp. I & II (T.P. Section)	Tech. Report Writing; Instru-mentation
Tech Prep Math I	Tech Prep Math II	Math 100 (T.P. Section)	Schematic Reading
Principles of Technology IA	Principles of Technology IB	Measuring Principles I & II	Bio-Med Systems I & II
U.S. History	Social Studies	Human Relations	Codes-Laws-Safety
SEE NOTE		College Chemistry	Applied Physiology
Electronics: Shop/Theory		Electron I & Lab * Electron II & Lab	Digital Elec. & Lab; Integra-ted Circuits
Physical Education	Physical Education	Active Networks I	Semiconductors Lab/ Microprocessor Theory

ARTICULATION: * Arrows indicate courses students may bypass if meeting articulation requirements. Students recommended by their teachers may earn five credits for Electronicsl/Lab while still in high school. Further articulation for credit being explored, e.g., Digital Electronics.

NOTES:

-Applied Bio/Chem at the secondary level could provide an excellent foundation for College Chemistry and Applied Physiology and increase likelihood of success in these courses.

-Students who do not meet program prerequisites will not necessarily be excluded from the program, but may have to spend more time in non-credit developmental courses. Students who exceed requirements can be placed in higher level math/science, etc. accordingly.

-Any students with intentions to transfer to a four-year degree program should be prepared to take additional math and physics courses.

SAMPLE TECH PREP CURRICULUM: Mechanical Engineering Technology CAD/CAM Option

Chicopee Comp. Voc.

Springfield Technical Community College

Junior Year	Senior Year	Freshman Year	Senior Year
Tech Prep Communications I	Tech Prep Communications II	English Comp I / Tech Report Writing	Soc. Sci. Elective / Humanities Elective
Tech Prep Math I	Tech Prep Math II	Tech Math I & II (T.P. Sections)	Strength of Materials / Adv. CAD Applic.
Principles of Technology IA	Principles of Technology IB	Mechanics	Fluid Mechanics / Technical Physics
Drafting: Shop/Theory		Mechanical Drawing* / CAD Level I*	CAD Level 2 / CAD Level 3
		OR	
Machining: Shop/Theory		Metal Machining I* / Machine Design	Computer-Aided Manuf. I & II
		Intro to Computer-Integrated Manufacturing / Production Processes	

ARTICULATION: * Arrows indicate courses students may bypass if meeting articulation requirement. Students recommended by their teachers under terms of a 2+2 agreement may earn from 3-6 credits while still in high school.

NOTES:

- Any student intending to transfer to four-year degree program should be prepared to take additional math and physics courses.
- The Mechanical Engineering Technology Program also offers an option in CIM (Computer-Integrated Manufacturing). Students may obtain more information by calling Admissions at X3207.

SAMPLE TECH PREP CURRICULUM: Computer Info Systems/ Data Processing (Microcomputer Specialist Option)

Franklin County Tech		Springfield Technical Community College	
Junior Year	**Senior Year**	**Freshman Year**	**Senior Year**
Tech Prep Communications I	Tech Prep Communications II	Eng. Comp. I & II	
Tech Prep Math I	Tech Prep Math II	College Math I & II	See note
P.T.IA.	P.T.IB.	General Psychology	Social Science Elective
H.S. Accounting I	H.S. Accounting II	College Accounting I & II	Humanities Elective / Business Elect.
Computer Technology Cluster (Data Processing Option)		Basic* Database Systems	CIS Word Processing / Networks & Commun.
		Basic Keyboard Skills*	Desktop* Publishing / Principles of Mgt.
Civics		Micro computer Applications / Adv. Spread Sheets	Operating Systems / Systems Analysis & Design
Phys. Ed.	Phys. Ed.		

ARTICULATION: * Arrows indicate courses students may bypass if meeting articulation requirement. Students recommended by their teachers may earn up to 8 college credits while still in high school. Further articulation for credit also being explored, e.g., Microcomputer Applications, CIS Word Processing, Accounting.

NOTE:

-Any student with intentions to transfer to a 4-year institution should be prepared to take additional math courses.

SAMPLE TECH PREP CURRICULUM: Graphic Arts Technology (Commercial Art Option)

Smith		Springfield Technical Community College	
Junior Year	**Senior Year**	**Freshman Year**	**Senior Year**
Tech Prep Communications I	Tech Prep Communications II	Eng. Comp. I (T.P. Section) Tech. Rpt. Writing	
Tech Prep Math I	Tech Prep Math II	Printing Technology Contemp. Math	Print Shop Mgt. Advertising Principles
P.T.IA. -or- Applied Bio/Chem.	P.T.IB -or- Applied Bio/Chem.	Social Science Elective Micro-computer Applications	Photographic Science Reproduction Photography
Printing Program: Shop/Theory		Basic Key-boarding* Basic Image Assembly*	Advanced Image Assembly Basic Design
U.S. History I	U.S. History II	Typography Layout	Graphic Computerized Graphic Design
Phys. Ed	Phys. Ed	Intro to G.A. Computer Desktop Publishing Typography	Offset Presswork* Advanced Desk top Publishing
ALTERNATIVE	OPTION:	PRINTING TECHNOLOGY	**SUBSTITUTE** Office Accounting & College Chem. for Design Courses **SUBSTITUTE** Chem of Lithograph & Color Reproduction Processes for Design Courses

ARTICULATION: * Arrows indicate courses students may bypass if meeting articulation requirements. Students recommended by their teachers can earn up to 7 college credits while still in high school.

NOTES:

-Students considering transfer to four-year programs will need additional math courses.

-Students with room in their schedule due to articulation credit can fill in with courses from the alternative option, thereby broadening their skills.

OUTSTANDING.

L to R: Vice Chairman of the Board of Trustees James McKeon, STCC President Andrew Scibelli, David Hebert, Chairman of the Board of Trustees Brian Corridan

Many of the students at Springfield Technical Community College are outstanding, in their personal as well as academic achievements. Here are just a few:

DAVID HEBERT was selected as the Outstanding Postsecondary Student of 1994 by the National Association of State Councils on Vocational Education. A 1993 graduate of STCC's Bio-Medical Instrumentation Technology program, he is currently a student at Rensselaer Polytechnic Institute. The director of the Mass. Council on Vocational Education said, "We are proud to have David chosen as the best in the country in this awards program. This only provides further evidence of the outstanding work that is done at STCC."

BRYGIDA PIETRAS-TRAZSKA was a pediatrician in her native Poland, but had to start over again in this country. She went through STCC's English as a Second Language program, was accepted into our highly competitive nursing program, and triumphantly graduated in June.

MARK AYERS, STCC's 1993-94 Student Government president, Honors program graduate and recipient of numerous College awards, will be attending Yale University this fall through a full scholarship.

Make STCC your first choice. Call today to see how you can become one of our outstanding students. Day Admissions 781-7822, extension 3855.

Your First Choice

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

Springfield Technical Community College
Tech Prep Office
(413) 781-7822, ext. 3160