RESOLUTION TO APPROVE THE BACHELOR OF SCIENCE DEGREE IN SUSTAINABLE BIOMATERIALS

WHEREAS, the Department of Sustainable Biomaterials has grown and diversified over the past 10 years to help address global technological and social interests related to the sustainable use of materials derived from our natural resources; and

WHEREAS, the bachelor of science in sustainable biomaterials will prepare students to analyze and respond to pressing global resource issues including the efficient and wise use of natural resources for shelter, materials and energy, and how to address the demand for products made from non-sustainable and non-renewable sources, and how future generations will address life-cycle issues with sustainable biomaterials from environmental, economic, and social perspectives; and

WHEREAS, the bachelor of science in sustainable biomaterials will prepare graduates for careers where there is strong demand, ranging from positions in the commonwealth's $25 billion forest products industry to innovation-based business and manufacturing in allied natural resources fields; and

WHEREAS, the degree is unique within the Commonwealth of Virginia and one of a very few similar programs within the United States; and

WHEREAS, the bachelor of science in sustainable biomaterials supports the commitment of the Department of Sustainable Biomaterials, the College of Natural Resources and Environment, and the university to educate students in environmentally sound technologies and innovations through the development and use of sustainable biomaterials;

NOW, THEREFORE BE IT RESOLVED, that the bachelor of science in sustainable biomaterials be approved effective fall 2013 and the proposal forwarded to the State Council of Higher Education for Virginia (SCHEV) for approval, and to the Southern Association of Colleges and Schools - Commission on Colleges (SACS - COC) for notification.

RECOMMENDATION:

That the resolution to approve the bachelor of science degree in sustainable biomaterials be approved.

June 3, 2013

Virginia Tech Degree Proposal
Bachelor of Science in Sustainable Biomaterials
(CIP: 03.0509)

Type of degree action (circle one): New Spinoff (Revision) Discontinuance

Program description

Virginia Tech requests approval for a Bachelor of Science (B.S.) degree in Sustainable Biomaterials to commence in the fall semester of 2014. This proposed degree program is a revision to and expansion of an existing degree, B.S. Forestry and Wildlife, located in the College of Natural Resources and Environment. For this degree, the term "sustainable" is defined as a multi-faceted balance of long-term environmental, economic, and social priorities as applied to natural and renewable biomaterials. "Sustainable biomaterials" are materials systems based on woody plant biomaterials (lignocellulosic materials) such as wood, bamboo, rattan, and palm used for residential construction and production of consumer goods. The B.S. degree in Sustainable Biomaterials will be unique in the Commonwealth and will rely on the use of innovation theory to catalyze education efforts in both sustainability and biomaterials under a new educational option. The goal of this program will be to provide students with the requisite knowledge and skills to transform traditional biomaterials production methods, building construction methods, and current business management practices into lasting and value-added solutions for the benefit of human society and the environment.

This degree will serve the needs of Virginia and the $25.2 billion forest products industry in the Commonwealth, as this industry seeks to adopt sustainable solutions because this approach permits conservation of the resource and is compatible with a growing national demand for renewable, green materials. In addition, the intent is for this degree to provide students with a national and global perspective on the use of sustainable biomaterials for structural and consumer products.

The proposed degree program will permit students to create, convey, and apply knowledge to expand their personal growth, advance social and community development, foster economic competitiveness, and improve quality of life through a focused curriculum in the development and use of sustainable materials, innovations in housing, and entrepreneurial activities. Graduates from the proposed degree will be proficient in the high-demand field of sustainable biomaterials and will provide an exceptional talent pool to sustain a vibrant Virginia economy.

Curriculum summary

The goal of this degree program is to give students a strong technical foundation in understanding natural biomaterials and how they perform as basic building blocks for structures and products that society needs, as well as how their

application scores in terms of environmental life-cycle impacts. Students can then build upon this technical foundation through one of three tracks with which to further develop their knowledge base: (a) Sustainable Enterprise, (b) Creating Sustainable Society, and (c) Sustainable Residential Structures. Respective learning outcomes in each of these tracks leads to a deeper understanding of how business, society, design, and housing technologies can influence overall sustainability issues when sourcing, using, maintaining, and recycling natural biomaterials. These tracks have been planned such that students gain appreciation of how disciplines in engineering, marketing, product design, process technology, and management can contribute towards the best sustainable use of our natural resources in meeting the needs of society.

The Sustainable Biomaterials degree comprises 120 credit hours distributed among the following categories: (a) Curriculum for Liberal Education (CLE) [36 credits]; (b) Sustainable Biomaterials common core courses [30 credit hours; listed below]; (c) Track courses [18-19 credit hours]; and (d) 12 free electives (35-36 credit hours).

Common Core in Sustainable Biomaterials (30 credit hours)
SBIO 1234 Introduction to Wood, Design and Craftsmanship (3)
SBIO 2124 Structure and Properties of Biomaterials (3)
STAT 3615 Biological Statistics I (3)
STAT 3616 Biological Statistics II (3)
SBIO 3004 Sustainable Nature-based Enterprise (3)
SBIO 3445-3446 Entrepreneurial Wood Design and Innovation (6)
SBIO 3454 Society, Sustainable Biomaterials, and Energy (3)
SBIO 4715-4716 Wood House (6)

Track Courses
Sustainable Enterprise Track: (18 credit hours)
SBIO 2614 Introduction to Forest Products Marketing (3)
SBIO 3464 Forest Products Business Systems (3)
SBIO 3554 Sustainable Biomaterials Enterprises (3)
ACIS 2115 Principles of Accounting (3)
FOR 4014 Natural Resources Economics (3)
MKTG 3104 Marketing Management (3)

Creating Sustainable Society Track: (18 credit hours)
FOR 2554 Nature and American Values (3)
SBIO 3324 Green Building Systems (3)
FOR 4014 Natural Resources Economics (3)
SBIO 2994 or 4994 Undergraduate Research; SBIO 2964 or 4964 Field Study; or SBIO 3954 Study Abroad (at least 3 credit hours)
SBIO 3554 Sustainable Biomaterials Enterprises (3)
AAEC 3314 Environmental Law (3)

Sustainable Residential Structures Track: (19 credit hours)
CHEM 1036 General Chemistry (3)
PHYS 2205 General Physics (3)
SBIO 2384 Behavior of Biomaterials (3)
SBIO 3314 Wood Mechanics (4)
SBIO 3324 Green Building Systems (3)
SBIO 4984 Design of Wood Structures (3)

Free Electives (35-36 credit hours)

Relevance to university mission and strategic planning

Virginia Tech's mission is to create, convey, and apply knowledge to expand personal growth and opportunity, advance social and community development, foster economic competitiveness, and improve the quality of life. The proposed degree program accomplishes these goals through a focused curriculum in the development and use of sustainable materials, innovations in housing, and entrepreneurial activities. The graduates from the proposed degree will be proficient in the high-demand field of biomaterials and will provide an exceptional talent pool to sustain a vibrant Virginia economy consistent with Virginia Tech's mission statement. Advancing community development, improving the quality of life, and fostering economic competitiveness are embodied within the Sustainable Biomaterials degree. Furthermore, this degree is STEM-H-oriented in that it provides all students in the curriculum with specific course-based core curriculum training in science, technology, mathematics, and health topics.

Justification for the proposed program

The Commonwealth of Virginia's forest resources contribute over $25.2 billion annually and 184,000 jobs to our economy, one of the largest contributors to the Gross State Product. This is a key statistic with regard to job creation in the field, and why the B.S. Sustainable Biomaterials degree is needed at this time. The proposed degree will enable graduates to make Virginia and the United States more competitive in the world economy through the innovative use of sustainable biomaterials from Virginia's forests and agricultural lands. To promote the wise use of this natural resource, the Commonwealth needs leaders trained to utilize, market, and manage products and services while recognizing long-term environmental, economic, and social priorities. Continued innovation will be required to serve human needs using forest biomaterials productively and sustainably, minimizing the amount of materials used to produce products, and reducing associated environmental impacts.

The goal of the B.S Sustainable Biomaterials degree is to produce graduates who can create and implement innovative solutions to the challenges of providing sustainable supplies of housing, home furnishings, and other renewable products which society demands. The proposed new degree will serve the growing green sector, equip our students with the skills and leadership necessary to be competitive, and help the Commonwealth maintain and expand its economic

development and employment in this sector.

Number of Students in Sustainable Biomaterials
(Wood Science and Forest Products) as of fall Census, September 2012

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 – Spring*
SBIO (WOOD)	50	49	46	37	32	38	41	40	36	32	28	43	53	58
Packaging**							1	1	7	6	9	10	19	36
Total Students	50	49	46	37	32	38	42	41	43	38	37	53	71	94

* As of May 14, 2013
** Packaging became an option in 2006. The numbers assume that students not in the Packaging major will be in the Sustainable Biomaterials Major

Resource Needs/Savings

Given that this degree is a revision to an existing degree program, no new resources are needed at this time. Faculty members for the newly named degree in Sustainable Biomaterials are currently housed within the existing Department of Sustainable Biomaterials. No additional space, equipment, administrative support, nor library resources are needed to implement this degree program.

RESOURCE	ESTIMATED COSTS (use NA if not applicable)
Faculty	NA
Administrative/Classified Staff	NA
Graduate Teaching/ Graduate Research Assistants	NA
Space	NA
Library	NA
Equipment	NA
Other	NA

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College of Natural Resources and Environment

Curriculum Update – Dr. Paul Winistorfer, Dean

Background

- The College of Natural Resources and Environment is nationally and internationally recognized for the quality and effectiveness of our faculty, students and alumni; we are leaders across all disciplines of the college. Our undergraduate and graduate academic programs are renowned for quality and innovation.

- We are one of the largest, most productive and effective programs in North America. We are in a position of leadership.

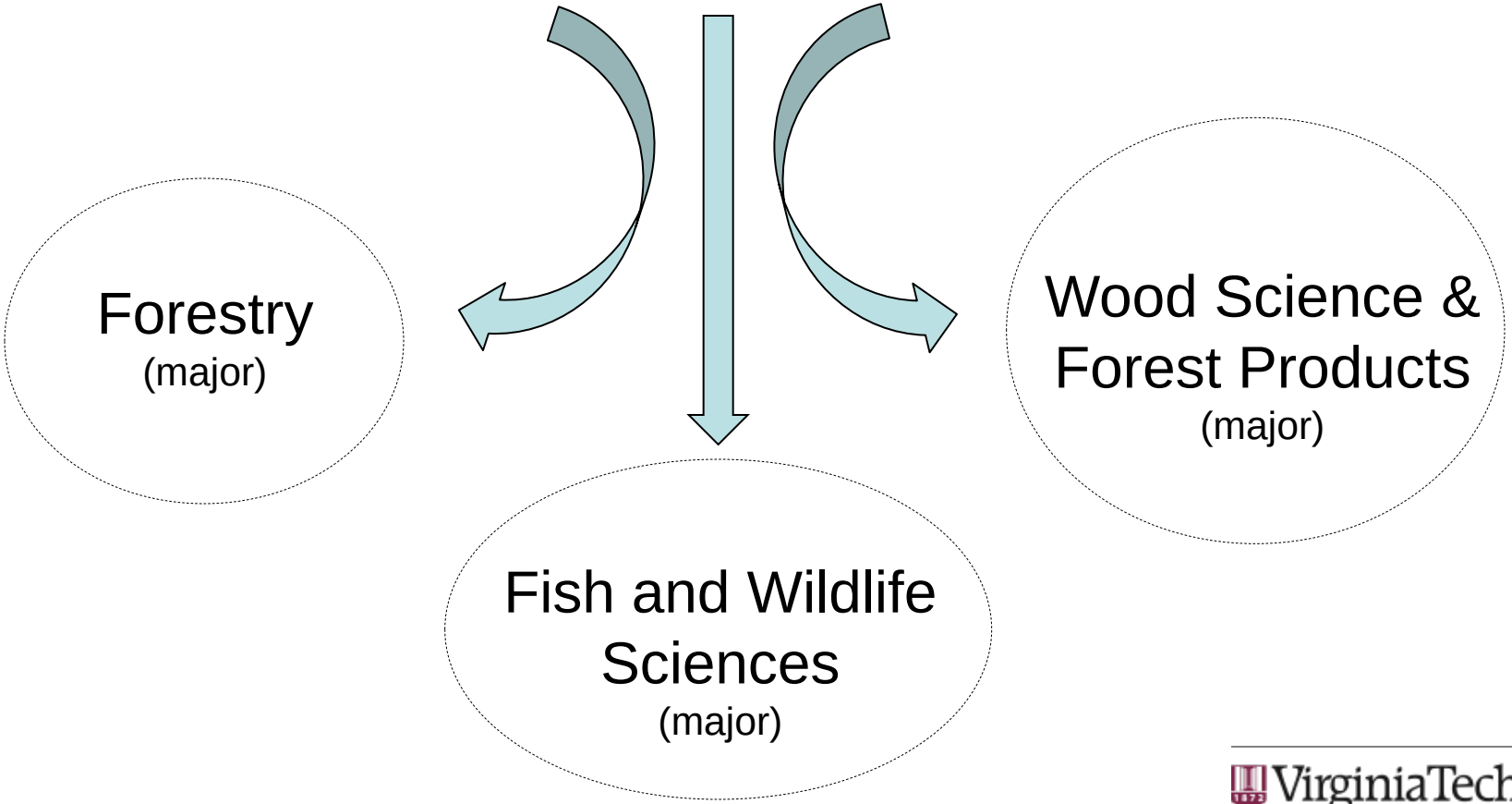
Background

- With the exception of the Geography program, all undergraduate students in the college come under a single B.S. degree program.

B.S. Forestry and Wildlife

College of Natural Resources and Environment

B.S. Forestry and Wildlife (present status of degree)



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Background

- Policy requires that majors within a degree program must have in common 25% of their total credit hours; i.e., the disciplines of forestry, fisheries and wildlife, and wood science must have in common 25% of their course credits. We have evolved to the point where this credit overlap no longer serves the needs of our students and employers.

- We are moving to create separate degree programs in the disciplines. We are innovating to create leading academic programs that align with college and university strategic goals. We are positioning for the future.

College of Natural Resources and Environment

B.S. Degree Portfolio (future status of degrees)

B.S. Forest Resources and Environmental Conservation

Will submit to Governance fall 2013

B.S. Fish and Wildlife Conservation

B.S. Sustainable Biomaterials
B.S. Packaging Systems and Design

For Consideration Now

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Outcome

- All departments of the college will offer their own B.S. degree program.
  - B.S. degree programs in the disciplines will be independent of each other.
  - B.S. degree programs will serve the needs of our students and future employers.
  - B.S. degree programs will enable us to continue to lead the North American landscape of academic programs

Outcome

- As a STEM-H college, we anticipate a growth in our college undergraduate enrollment.
- These new degree programs will create opportunities for existing STEM-H students on our campus.
- Ultimately, we are positioning our academic programs for the future, as we have positioned the entire college portfolio for the future.

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Sustainable Biomaterials

A proposed Bachelor of Science degree program – Dr. Audrey Zink-Sharp

Background

- Department of Sustainable Biomaterials
  - Established in 1979 as Wood Science and Forest Products
    - Renamed in 2012 to reflect growth and diversification
  - Repositioning our department with 2 new proposed B.S. degree programs
    - Sustainable Biomaterials
    - Packaging Systems and Design

B.S. Sustainable Biomaterials

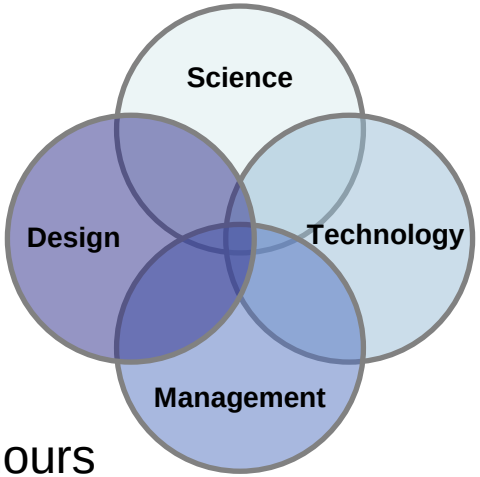
- Strong employer and student demand
- Unduplicated within the Commonwealth
- Supports departmental and college goals toward sustainable utilization and conservation of natural resources

B.S. Sustainable Biomaterials

- Aligns with Virginia Tech's educational missions
  - Social and community development
  - Economic competitiveness
  - Improved quality of life
- Complements the strategic plan "A Vision for a New Horizon"
  - Environmental Stability
    - Materials and Technology
    - Natural Resources
  - International Profile
  - Diversity

B.S. Sustainable Biomaterials

- Redesign of existing curriculum with new and revised courses



- Proposed Degree Program
  - 120 total credit hours
    - SBIO core: 30 credit hours
    - Curriculum for Liberal Education: 36 credit hours
    - Track electives: 18 – 19 credit hours depending on track
      - Business, Society & Values, Residential Structures
    - Free electives : 35 – 36 credit hours
- Distinctive experiential learning capstone

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Outcomes

- Graduates with unique problem-solving skills, knowledge, and perspectives
- Improved engagement and economic development opportunities
- New growth areas

Questions ?