RESOLUTION TO APPROVE THE BACHELOR OF SCIENCE DEGREE IN PACKAGING SYSTEMS AND DESIGN

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 and development of packaging materials derived from natural materials and allied hybrid material systems; and

WHEREAS, the bachelor of science in packaging systems and design will prepare students to analyze and respond to the needs of both consumers and industry partners in a field that broadly intersects many important areas of the global economy; and

WHEREAS, Virginia has a growing need for packaging professionals given that it serves as a hub for manufacturing and global transportation of goods and products that require packaging materials for containment, preservation, protection, dispersal, and communication about the content and value of those products; and

WHEREAS, the bachelor of science in packaging systems and design will prepare graduates for careers in the $420 billion global packaging industry ranging from design of international shipping containers to the development of non-toxic films for the encapsulation and packaging of food and pharmaceuticals; and

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

WHEREAS, the bachelor of science in packaging systems and design supports the commitment of the Department of Sustainable Biomaterials, the College of Natural Resources and Environment, and the university to educate students in the environmentally sound development and use of sustainable packaging materials;

NOW, THEREFORE BE IT RESOLVED, that the bachelor of science in packaging systems and design 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.

RECOMMENTATION;

That the resolution to approve the bachelor of science in packaging systems and design be approved.

June 3, 2013

Virginia Tech Degree Proposal
Bachelor of Science in Packaging Systems and Design
(CIP: 15.1503)

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 Packaging Systems and Design 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. The revised B.S. degree in Packaging Systems and Design will be housed in the Department of Sustainable Biomaterials, will be unique in the Commonwealth, and will meet a growing demand for education in the area of packaging science which is being driven both by societal needs for environmentally sound packaging and by industrial growth. Packaging is currently the third-largest industry in the United States (and part of a $420 billion packaging industry worldwide) and the need for well-educated graduates is particularly strong in states like Virginia that serve as international transportation hubs.

The B.S. program in Packaging Systems and Design will prepare students for careers in industries producing and utilizing packaging materials of all types. Packaging is an essential part of industrialized economies and it functions to protect, preserve and facilitate the transport of products while aiding marketing. Demand and necessity for packaging materials and services related to virtually all industrial sectors dictate that graduates in this field also must play key roles in interfacing with many industries.

Graduates from the Packaging Systems and Design degree program will have the capability to optimize packaging processes, to design environmentally-appropriate packaging systems as part of the entire packaging life cycle chain, and to develop the next generation of advanced packaging technologies. Graduates from the program will serve regional, national and global community needs, as well as the multibillion-dollar international industry. Several packaging industry partners are strongly supportive of the development of this degree at Virginia Tech.

We anticipate that offering this degree at Virginia Tech will permit residents of the Commonwealth to take advantage of education in this field without having to travel to out-of-state universities, and in turn, our program will attract out-of-state students.

Curriculum summary

The curriculum for the B.S. in Packaging Systems and Design has been developed based on a review of curricula at major packaging programs throughout the U.S., on our review of the needs of various packaging industries, and on direct discussion with and input from packaging companies.

The course content for the degree combines critical content from the fields of industrial engineering, industrial design, chemistry, material science, and marketing. Providing the

opportunity to gain hands-on experience in various packaging areas is an essential part of the proposed degree program. Students are encouraged to obtain experience either through activities sponsored by the Center for Packaging and Unit Load Design within the Department of Sustainable Biomaterials (a Center that has existed for 30 years at Virginia Tech and provides infrastructure support for the developing degree program) and/or related summer employment and student club activities.

The proposed B.S. Packaging Systems and Design degree program includes 120 credit hours distributed among the following categories: (a) Curriculum for Liberal Education (36 credits); (b) Packaging Systems and Design core (42 credits; listed below); (c) statistical analysis (3 credits); (d) writing skills (3 credits); (e) chemical and physical sciences (6 credits); and (f) free electives (30 credit hours).

Packaging Systems and Design Core: (42 credits)
SBIO 2104 Principles of Packaging (3)
SBIO 2114 Packaging Law and Regulation (3)
SBIO 2124 Structure and Properties of Sustainable Biomaterials (3)
SBIO 2384 Behavior of Sustainable Biomaterials (3)
SBIO 2614 Introduction to Forest Products Marketing (3)
SBIO 3124 Paper and Paperboard Packaging (3)
SBIO 3214 Food and Health Care Packaging (3)
SBIO 3224 Packaging Distribution Systems (3)
SBIO 3284 Packaging Polymers and Production (3)
SBIO 4024 Packaging Design for Global Distribution (3)
SBIO 4054 Packaging Systems Design Practicum (3)
SBIO 4224 Wood Pallet, Container & Unit Load Design (3)
MKTG 3104 Marketing Management (3)
MKTG 4204 Consumer Behavior (3)

Relevance to university mission and strategic planning

The proposed program supports the missions of the Department of Sustainable Biomaterials in the College of Natural Resources and Environment, and Virginia Tech as a public land-grant university serving the Commonwealth of Virginia, the nation, and the world community. Through the discovery and dissemination of new knowledge, Virginia Tech's Vision and Mission (http://www.president.vt.edu/mission_vision/mission.html) focus on the creation, conveyance, and application of knowledge to improve the quality of life for our populace. In that spirit, the Packaging Systems and Design degree program in the Department of Sustainable Biomaterials will strive to embody Virginia Tech's mission as it invents the future of the packaging world, providing a creative environment to grow educational and public service programming that will lead to a higher quality of life both within and beyond the Commonwealth. The B.S. in Packaging Systems and Design also adheres to Virginia Tech's *A Plan for a New Horizon* (2012-2018) in engaging in meaningful undergraduate experiences and opportunities that allow students to explore and discover solutions to the world's pressing issues. 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

Packaging is a cutting-edge discipline requiring a highly educated workforce, with the capacity to provide a variety of employment opportunities in diverse industries. Consumers, industries, and communities have demanded multi-functional packaging systems serving various roles in the 21st century. According to the US and Global Market Size Study, packaging is the third largest industry in the US with $120 billion in annual revenues. The industry's market size in 2014 is forecast to have a value of $126 billion in the US alone, an increase of 4.8% from 2009 during a recessionary period. More detailed analyses suggest that the packaging industry market growth potential is far greater than these statistics suggest.

Regulation to reduce the environmental impact of packaging has resulted in the need for continual innovation by educated professionals in the field to develop optimized packaging systems and designs through the whole packaging life cycle chain. As a result, there has been a strong demand in the field for college graduates with training in technical areas to help businesses keep up with continued demand in the field while adapting to changing business and technology environments. Undergraduate educational programming in the field of packaging is in demand particularly with regard to degree programs that have a focus on issues such as environmental sustainability, economic efficiency, and social aspects to meet societal demands in the packaging field.

The proposed B. S. degree in Packaging Systems and Design will focus on the multidimensional aspects of packaging technology to meet unique needs for society and fit the diverse needs of an industry that has many niche markets. The success of major and minor academic programs in the field has already been demonstrated by universities in several other states, (e.g., California, Michigan, New York, Wisconsin, South Carolina) but no other state (other than perhaps California) has as great a need for highly educated packaging experts than Virginia because of its strong industrial base, its geographic positioning as a transportation hub, and its status with major port cities on the eastern seaboard (including the major shipping ports of Norfolk, Portsmouth, and Newport News). There is a clear need for an undergraduate packaging degree program that can serve both industry and non-profit organizations. Implementation of the B.S. Packaging Systems and Design degree program would move the Commonwealth into the educational forefront of this vital and expanding field.

Resource Needs/Savings

Given that this is a revision to an existing degree program, no new resources are required for its implementation or maintenance. The primary faculty members involved in the B.S. Packaging Systems and Design degree are currently employed in the Department of Sustainable Biomaterials at Virginia Tech. The administrative staff currently serving the needs of the majors in the Department of Sustainable Biomaterials is sufficient to take on responsibilities associated with the new degree. Adequate

space, equipment, library resources, and other infrastructure needs are currently available for this new degree.

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

VirginiaTech
Invent the Future

Packaging Systems and Design

A Proposed Baccalaureate Degree Program – Dr. Robert Bush

Background

- William H. Sardo, Jr. Pallet and Container Research Laboratory (1976)
- Center for Packaging and Unit Load Design (1990s)
- Established Option and Minor

Justification

- Unduplicated in the Commonwealth of Virginia and surrounding states
- Serves a broad Virginia industrial sector
- Strong employment and career opportunities for students

Justification

- Supports Departmental and College strategic goals
- Growth Areas: Nano-materials; flexible packaging, smart packaging, sustainable packaging

Proposed Program

- Packaging Core (42 credit hours)
- Curriculum for Liberal Education (36)
- Chemical and Physical Sciences (6)
- Statistics (3)
- Technical Writing (3)
- Free Electives (30)

Support

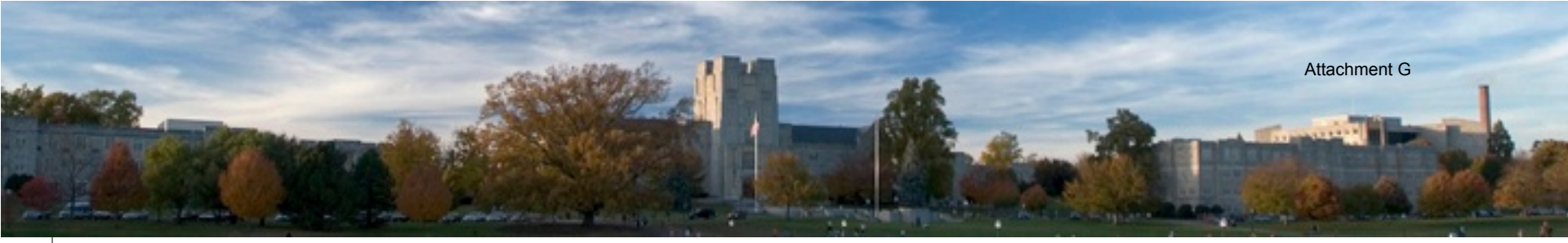
- Trade and Professional Associations
  - AF&PA – Paperboard Packaging Alliance
  - Glass Packaging Institute
  - Sustainable Packaging Coalition
  - Technical Association of the Pulp and Paper Industry

Support

- Businesses
  - MeadWestvaco
  - Corrugated Container Corporation
  - Phoenix Packaging Group
  - Printpack, Inc.
  - Packaging Corporation of America
  - ESKO Software
  - Gerber Scientific

Outcomes

- Discovery
  - Undergraduate research
  - Preparation for graduate study
- Engagement
  - Center for Packaging and Unit Load Design
  - VT Engage
- Learning



Questions ?