College of Urban Sustainability and Environmental Science
(CUSES)

New Environmental Challenges

New Opportunities for Our Students

and Faculty

October, 2009

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COLLEGE OF THE URBAN SUSTAINABILITY AND ENVIRONMENTAL SCIENCE

The College of Urban Sustainability and Environmental Science (CUSES) at the University of the District of Columbia is being developed to respond to the necessary, ever-present and continuing engagement of an educated humanity as stewards of the Earth. Human behavior and economic systems are having an impact on the environment. Environmental degradation has inspired many urban residents to become cognizant of food security and food safety, thus producing their own fresh produce on balconies, rooftops, windows, and on small plots of public and private land. It is time for mankind to begin living harmoniously with our natural environment, without depleting the planet.s natural resources for future generations. The CUSES is in sync with a movement across the United States and the International community that is acknowledging a great need for educational programs that will provide our students or future scientists with information and skills that will preserve and sustain our Planet Earth. As Michael Stone states in his 2009 publication Smart by Nature: a Schooling for Sustainability, "This movement responds to the realization that the young people in school today will inherit a host of pressures and escalating environmental challenges. This generation will require leaders and citizens who can think ecologically, understand the interconnectedness of human and natural systems, and have the will, ability, and courage to act."

The educational programs need to provide the mechanical and leadership skills that will enable students to address the problems facing 21st Century populations. The program offerings of the new college will expose students to diverse academic disciplines environmental science, nutrition and food science, urban architectural design, economics and social science, and urban sustainability, which are critical to creating solutions in these challenging times. The college.s multi-disciplinary programs will provide students with a well rounded education by combining the knowledge, skills and values of these disciplines with practical hands-on- experiences outside

the classroom within Washington, DC and the surrounding metropolitan area. Students will be capable of both communicating and learning across disciplines and have a strong orientation towards problem solving, analytical acumen and quantitative methods, and understand that their multi-disciplinary skills will enable them to become life-long stewards of the earth.

1. College Mission, Description and Degree Programs

1.1. Challenges

Today.s rising environmental challenges include global warming, climate change, water quality, urban sustainability, sustainable urban design, environmental degradation, watershed restoration, food security and safety, emerging chemical and biological contamination, dwindling energy sources, socio-economic issues and population growth, just to name a few. The University of the District of Columbia needs a new interdisciplinary college that addresses those problems.

1.2. Mission

The mission of the College of Urban Sustainability and Environmental Science (CUSES) is to offer quality, affordable, interdisciplinary bachelor.s and graduate degree programs, conduct research and outreach programs focused on areas of agriculture, environmental sciences, sustainability and architecture for urban areas, especially the District of Columbia. These programs advance knowledge and prepare students for immediate entry into the workforce, for the next level of education, for specialized employment opportunities and lifelong learning.

1.3. Vision

The Vision of the college is to be recognized for enhancing urban environmental sustainability and the quality of urban life through its graduates, scholarship and service in the land-grant tradition serving the people of the Washington, DC and the nation.

1.4. Core values

The core values of CUSES are: 1) secure in our mission and confident in our work; 2) train students in 21st century skills to be leaders in sustainability, urban architectural design, environmental issues, nutrition and food science, economics and social sciences; 3) respect one another to work collaboratively with openness, integrity and honesty; 4) to be of service to our community and nation through integrated education, research, extension and outreach; 5) maintain our commitment to embracing cultural diversity among our students, faculty and staff; 6) passion in working towards finding solutions to challenges and inspire innovative thinking that will lead to productive and life-long learning, and 7) instill environmental stewardship to meet today.s and future generations. needs.

1.5. Goal

The College of Urban Sustainability and Environmental Science will prepare specialists and citizens to produce future professionals with interdisciplinary skills that our society needs pertaining to the environment, urban architectural design, food science and nutrition, economics and social science and urban sustainability. Consistent with the University of the District of Columbia.s land grant-mission, CUSES goals are immersed in learning, research and extension and outreach.

1.5.1. Learning Goals

. Proficiency in oral and written communication.
. Analyze ethical issues as related to environmental sustainability.
. Analyze environmental issues from an interdisciplinary prospective.
. Able to apply acquired knowledge of information technology, identify environmental problems and contribute to the solution.
. Identify the social, biological, physical sciences and humanities interactive effect on complex environmental problems.
. Enhance student learning and development through service learning.

1.5.2. Research Goals

. Develop analytical techniques and cost-effective mitigation strategies to reduce environmental pollutants or contaminants.
. Develop analytical techniques and abatement methods of air, soil and water pollution.
. Conduct monitoring and assessment of environmental quality to protect and improve the quality of the natural environment.
. Conduct research related to food and nutrition in order to address health problems such as obesity, diabetes and cardiovascular diseases.
. Develop sustainable urban design.
. Increase the scholarly capacity, capability, recognition and impact of University

investigators.

1.5.3. Extension and Outreach Goals

. Assist the public understanding of complex issues related to environmental quality and to meet changing environmental regulations.
. Transfer multidisciplinary based content and concepts to audiences other than formal graduate and undergraduate programs.
. Serve as a bridge between the UDC and the DC community facilitating understanding and information sharing to improve the quality of life.
. Develop and disseminate tools and information of research findings and further develop the continuing research program.
. Offer a range of environmental educational programs covering water quality, waste management, collaborative problem-solving and more.

1.6. Program Description

The College of Urban Sustainability and Environmental Science is organized into three areas (See Figure 1): Academic, Research and Extension and Outreach.

1.6.1. Academic program

The academic programs of CUSES are:

(1) Urban Agriculture: includes the nutrition degree programs (also possible future urban agriculture or horticulture degree programs), AES, Family & consumer science, and 4-H outreach
(2) Architecture and Urban Design: B.S. and M.S. Architectural degree programs, the Architectural Research Institute (ARI) and Community Resources & Economic Development
(3) Environmental Science, including degree programs in environmental science, water resources; WRRI, World Rivers Institute, and CES activities in environment and natural

resources.

These three major areas interconnect with the research and outreach programs.

As illustrated in Figure 1, CUSES offers nine degree programs, six undergraduate and three graduate programs. In the Division of Environmental Science, two B.S. degree programs (Environmental Water Quality and Urban Sustainability) and one graduate program (Professional Science Master Program in Water Resource Management) are new. The existing General

Organization Chart

CUSES

Academic

Research Units

B.S. Deg. in ES-
Urban Sust.
NEW

Agriculture
Experiment
Station

Water Resource
Research
Institute

Cooperative
Extension
Service

Com. Resource
and Econo.
Development

Environment and
Natural
Resource

Family and
Consu. Sci. & the
Center for NDH

4-H & the Center
for Youth
Development

Architecture
Research
Institute

B.S. Degree. in
N&FS –Dietetics

M.S. Degree in
Architecture

Div. of Urban
Agriculture

Div. of
Architecture &
Urban Design

Div. of
Environmental
Sciences (ES)

Dept. of
Nutrition & Food
Science

B.S. Degree in

Architecture -
Revised

B.S. Deg. in

ES -Water
Quality- NEW

B.S. Deg. in ES-
General

Dept. of
Architecture &
Comm. Plan.

Dept.
Environmental
Science (ES)

World‘s River
Institute-

New

B.S. Degree in

N&FS-FS

M.S. Degree

in Nutrition

PSMP in Water
Resource Mangt.
New
Management

Figure 1. Structure of College of Urban Sustainability and Environmental Science (CUSES) with new (in pink boarder) and existing programs: PSMP-Professional Science Master Program.

Organization Chart
Extension

& Outreach

PSMP in Water Resource
Management - NEW

World's River Institute:

NEW

B.S. Degree in ES-Urban
Sustainability - NEW

B.S. degree in

ES -Water Quality - NEW

B.S. degree in ES-General

M.S. Degree in Architecture

B.S. Degree in Architecture -
Revised

M.S. Degree

in Nutrition

B.S. Degree in

N&FS-Food Science Option

B.S. Degree. in N & FS –
Dietetics Option

Div. of Environmental Scs. (ES)

Dept. of Environmental Sc.

Div. of Architecture & UD

Dept. of Arch. & Comm. Plan.

Div. of Urban Agriculture

Dept. of Nutrition & Food Sc.

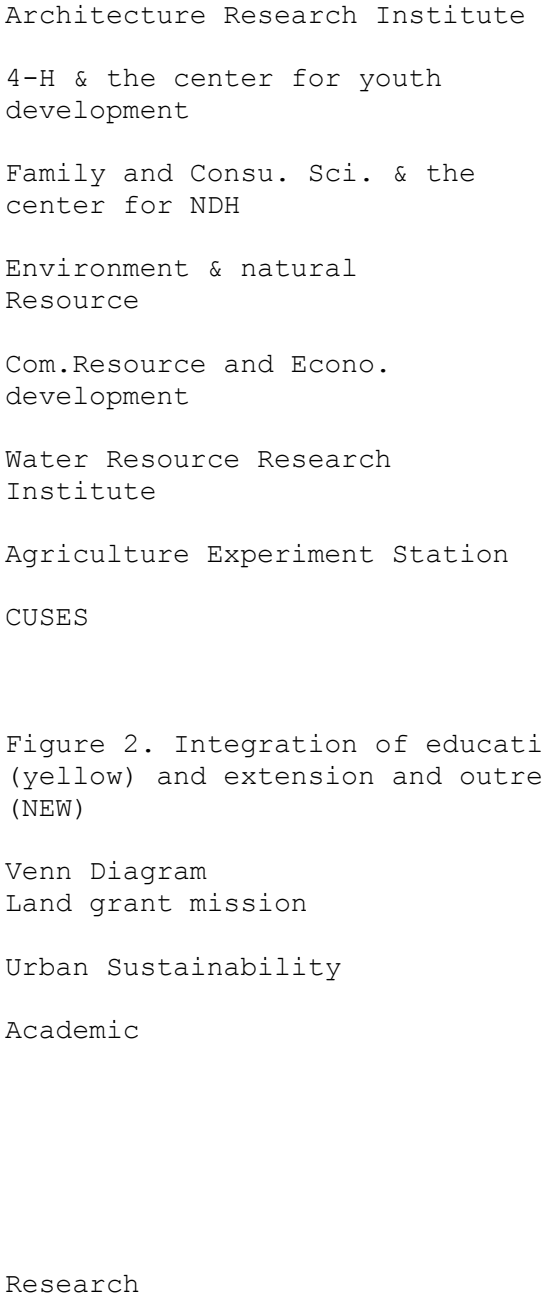

Figure 2. Integration of education/academic (dark blue), research (yellow) and extension and outreach (turquoise color) with new programs (NEW)

Environmental Science B.S. degree program has been revised and essential timely capstone courses are added. In the Division of Urban Agriculture, B.S. degree in Nutrition and Food Science – Dietetic option; and B.S. degree in Nutrition and Food Science-Food Science option are the existing program, while M.S. degree in Nutrition is approved by the University Senate and the Board. In the Division of Architecture, the B.S. degree in Architecture is the existing program, while the M.S. degree program in Architecture is also approved by the senate. Both in the existing as well as the new undergraduate degree programs, students must fulfill the University-wide General Education Requirements of 42 Credit Hours:

Course Title	Credit Hours
Foreign Language	6
Philosophy	3
Fine Arts	3
English Comp I & II	6
Lit & Adv Writ I & II	6
Social Science	6
Mathematics	6
Natural Science	6

1.6.2. Research units

The CUSES research program is organized into four units:

. Agricultural Experiment Station (AES): The Agricultural Experiment Station (AES) is a research unit funded by USDA to promote research programs relevant to the needs of all citizens residing in the totally urban environment of our nation.s capital. As the Station is challenged to address problems that are unique yet germane to an urban society, it is committed to implementing projects and activities that enhance the quality of life for residents of the District of Columbia. Research supported by the Station is conducted by faculty members from various departments throughout the University and

by the research staff of the unit. A concerted effort is made to involve students in all aspects of research. Such involvement includes service as research aides, education technicians, and federally-supported research trainees. Faculty members who are project leaders serve as mentors for these students.

. Architecture Research Institute (ARI): The Architectural Research Institute (ARI) was established to promote a cross-disciplinary research program pertaining to emerging architectural research initiatives in design and urban planning that creates livable, compact, global cities that are eco-sustainable. It also promotes the development of undergraduate, professional and academic programs in construction, and architectural technology. The institute undertakes professional service grant contracts that will assist

the D.C. government and non-profit agencies with physical/capital improvement
initiatives.
. Water Resources Research Institutes (WRRI): first established at land-grant
institutions, coordinates and facilitates water resources related research projects through
seed grants funded through US Geological Survey to faculty within the consortium of
Universities to conduct water management research. The WRRI, through student
internships, also trains future scientists in the resolution of state and regional water
problems. Additionally, the WRRI.s staff and associated investigators continue to
provide the District of Columbia with inter-disciplinary research support to both identify
and contribute to the solution of the District.s water resources problems.

. World River's Institute (WRI) - River is one of the earth.s most remarkable resource
(less than 1% of the world available water resource), and the world communities must be
dedicated to preserving and protecting this irreplaceable gift –water. The goal of the
World River.s Institute is to develop programs and projects that demonstrate our deep
commitment to careful stewardship of the world.s river resources. Through collaborative
effort with academic, local and international environmental agencies in terms of research,
public advocacy, and education on river systems, the institute will enhance people.s
understanding of the role of fresh water on their lives.

1.6.3. Extension and Outreach

The Extension/Outreach Unit, the District of Columbia.s Cooperative Extension Service (CES),
is a district-wide informal education system. The CES educational system works directly with
District residents using the land-grant system.s research and experience to help solve individual
and community problems. CES educates District residents through free and fee-based, non-

credit education classes, workshops, demonstrations and provides technical assistance and
informational materials such as brochures, fact sheets, bulletins, and newsletters in four major
programmatic areas. The four programmatic areas of CES are:

. Community Resource and Economic Development.

The CRED Program offers programs to improve the welfare and economic well-being of
District residents through business and career development, financial planning,
coop/community economic development, and housing improvement practices.

. Environment and Natural Resources.

ENR provides programs for DC residents for a greater harmony with the environment
and continuing professional education to meet licensing and certification requirements for
pesticide applicators, water quality technicians, and horticulturists.

. Family and Consumer Sciences; The Center for Nutrition, Diet, and Health

The overall goal for the Family and Consumer Sciences and the Center for Nutrition,
Diet, and Health is to enhance the nutrition, diet, health and total well-being of both
individuals and families within the District of Columbia through research and education,
and provides the education to meet the certification requirements for food protection
managers.

. 4-H and the Center for Youth Development

The 4-H and CYD establish school and community-based 4-H clubs as well as implement
programs to assist young people in discovering and developing their leadership abilities and
foster confidence in those abilities to become successful in life.

1.7. Interconnectivity of the Academic, Research and Extension programs

The CUSES provides 21st century cross-disciplinary undergraduate and graduate degree
programs that are state-of-the art course programs in environment, urban sustainability, water
quality, water resource management, nutrition and food science, and architecture and sustainable
urban design. Students enrolled in the proposed new college will also take courses in the other
colleges such as College of Arts and Sciences, School of Law (law clinic), School of Business

and Public Administration, School of Engineering and Applied Sciences, and will utilize the
Learning Resource Center. This interconnectivity among different schools enhances the student
enrollment rate of those schools.

Within the new college, the proposed curricula were designed to have a synergetic effect on
academic, research and extension and outreach programs through good team work and
collaboration for the common goal of helping one another improve the quality of education,
research and outreach outcomes. Faculty and research staffs have an opportunity to apply for and
receive research grants from AES and WRRI. Students enrolled in the B.S. degrees in
Environmental Science will participate in the research and laboratory activities conducted by
AES, WRRI and WRI. Students enrolled in the Department of Nutrition and Food Science will
participate in the service learning projects provided under the Center for Nutrition, Diet and
Health in the Cooperative Extension Service. The staff members of the Community Resource

and Economic Development, Cooperative Extension Service (CES), will be able to collaborate
with the School of Business and Public Administration. Other CES programs, Environment and
Natural Resources, will also work closely with AES, WRRI and WRI.

2. DIVISION OF URBAN AGRICULTURE

2.1. Department of Nutrition and Food Science

2.1.1. Program Description

The Department of Nutrition and Food Science offers a Bachelor of Science Degree in Nutrition and Food Science. The program is designed to prepare students to maximize their qualifications for entrance into the dietetic and/or food processing and food technology industry. The program offers two areas of emphasis: dietetics and food science. Each program provides for competencies in several areas of work; however, each option is designed specifically for certain professional careers.

The Baccalaureate degree in Nutrition and Food Science with a dietetics option fulfills the requirements of the Didactic Program in Dietetics (DPD) and is accredited by the Commission on Accreditation/Approval for Dietetics Education (CAADE) of the American Dietetic Association (ADA). The Dietetics major develops an understanding and competency in food, nutrition, dietetics, management, clinical nutritional care, nutrition education, community nutrition and supportive courses in physical and biological sciences (biochemistry, anatomy and physiology, microbiology, statistics, and chemistry). The curriculum is developed within the conceptual framework of the accreditation standards and knowledge competencies for the dietetic profession set and published by the American Dietetic Association. The completion of the Bachelor.s degree with the dietetics option qualifies students to enter post-baccalaureate internship programs, which leads to eligibility to take the nationally administered examination to become a Registered Dietitian (RD).

This department also offers Master of Science in Nutrition which provides a strong foundation in science, research, technology and information systems.

2.1.2. Mission Statement

The mission of the Nutrition and Food Science Program at the University of the District of Columbia is to educate students majoring in nutrition and related disciplines and other fields to become leaders in the field of nutrition and public policy.

2.1.3. Degree Offerings in the Department of Nutrition and Food Sciences (NFSC)

The degree programs offered by the Department of Nutrition and Food Sciences are: Bachelor of Science in Nutrition and Food Science and Master.s of Science in Nutrition.

The Nutrition and Food Science graduates in both of these options frequently elect to go on to graduate studies in Nutrition or Food Science. Dietetics graduates are prepared for a wide scope of rewarding careers such as dietitians, licensed nutritionists, educators, consultants, researchers, food columnists, and entrepreneurs. The graduates with food science option are prepared to enter careers as food research specialists, food columnists, food technologists, health inspectors, food analysts, product developers, and quality control staff.

Majors who intend to apply for dietetic internship upon completion of Bachelor of Science degree in Nutrition and Food Science with dietetic option will be eligible to receive a Verification Statement duly attested by the Director of the DPD Program.

The students are required to complete a comprehensive examination and exit interviews prior to the issuance of the Verification Statement.

2.1.3.1. B.S. Degree in Nutrition and Food Science – Dietetics Options

Total Credit Hours of College-Level Courses Required for Graduation is 127 (See Appendix I A)

Required Departmental Courses: 54 credits

Required Supporting Courses: 37 credits

University-wide Requirements: 36 credits

2.1.3.2. B.S. Degree in Nutrition and Food Science – Food Science Options

Total Credit Hours of College Level Courses Required For Graduation is124 (See Appendix I B)

Required Departmental Courses: 56 credit

Supporting Courses: 32 credits

University-wide Requirements: 37 credits

Note: Recommended social sciences courses: a) Introduction to Psychology and b) Introduction
to Sociology.

Recommended Electives 7 Credit

1333 210/212 Food Processing II Lecture/Lab 4

2213 306 Human Resource Management 3

2.1.3.3. M.S. Degree in Nutrition/Dietetics

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The Graduate Program in Nutrition/Dietetics (GPND) at the University of the District of Columbia will be a new and innovative, dynamic Master of Science program that will broaden the scope of learning and teaching in the discipline of nutrition. The program will provide a strong foundation in science and research, technology and information systems, and the scientific knowledge of nutrition with emphasis on public policy and communication. Additionally, the program in Nutrition/ Dietetics is committed to providing students with a broad based culturally sensitive education to prepare them to promote public policies related to nutrition that will affect the well being of individuals and groups locally, nationally and internationally. In keeping with the university.s open admission policy, qualified applicants majoring in nutrition, related fields, and other disciplines who are desirous of participating in the program will be admitted, provide space is available.

Total Credit Hours Required For Graduation is 32 (See Appendix I C).

3. DIVISION OF ARCHITECTURE AND URBAN DESIGN

3.1. Department of Urban Architecture and Community Planning

3.1.1. Mission

The mission of Department of Architecture is to provide its students with a NAAB accredited professional degree program that is nationally, regionally and locally competitive. The Department will provide teaching that equips our students with the marketable 21st century IT and CAD-based skills and ethical values essential to effectively producing maximum sustainability in the design and planning of buildings, neighborhoods and communities. Through ARI, the Department will continue to pursue a research and community service agenda that continues to utilize its human resources and capital assets to support the District of Columbia.s mission of providing affordable and energy efficient shelter to its citizens.

3.1.2. Vision

The Department of Architecture will be a UDC Academic Center of Excellence that exemplifies the Urban Land Grant mission of UDC. The Department will pursue excellence in architectural, urban design and urban planning education through the adoption of “best practices” and “case studies” drawn from similar collaborative efforts between urban communities and public university based architecture schools. The Department will also be a city-wide forum for exchange, debate and outreach education about critical cultural and social issues that frame community planning and design.

3.1.3. Adequacy of current facilities and need of additional space (offices, classrooms, labs, etc.)

1. Acquire two additional full-time tenure-track faculty persons in order to have the minimum four (4) full-time faculty members required to cover the 5 years of design studios and other architecture courses in the BS/Masters programs.
2. Acquire one additional classroom space to be utilized as a dedicated studio for the

anticipated 15 to 20 students that would make up the initial Masters class (this group of students would be a mixture of past UDC architecture program graduates and graduates from other universities, most of whom require evening studios to pursue their educational objective of a professional degree from a NAAB eligible program).

3.1.4. Degree Offerings in the Department of Architecture

The degree programs to be offered by the Department of Architecture are: Bachelors of Science
in Architecture and the Master of Architecture.

3.1.5. Bachelor of Science in Architecture - Revised

Total Credit Hours of College-Level Courses Required for Graduation in Bachelors of Science
Degree is128 (See Appendix II A). Technical electives require prior departmental approval. A
minimum grade of “C” is required for each major course.

3.1.5.1 Overview of B.S. degree in Architecture

The program is designed to meet the needs of high school graduates interested in the field of
architecture, persons already holding an associate.s degree in architecture or related fields, and
students transferring from other architectural schools. Professionals such as architecture and
construction industry technicians, draftspersons and junior managers, who may have
accumulated course experience applicable to an architecture degree can be supported by this
program. The graduates from this program will be prepared for admission into the graduate
program and professional schools or may assume positions in industry, consultancy, regulatory
agencies, non-profits, non-governmental organizations, or local, state or federal government.

3.1.6. Master’s of Science in Architecture

The National Architectural Accrediting Board (NAAB) accredited Master of Architecture
program at UDC makes the institution only the eighth NAAB accredited HBCU-based
architecture program in the country (out of a national total of 117 NAAB accredited programs).
A NAAB accredited Architecture program provides the only, industry-recognized evaluation of
the academic level currently being achieved by UDC architecture students. Upon graduation
from the UDC Master of Architecture program students become immediately eligible to sit in for
the Architects Registration Exam (ARE). Graduation from an NAAB accredited program is the
only route available for taking the ARE and becoming a licensed architect.

The accredited, evening-based professional degree program in architecture, at UDC, is the only

such program at a public university in Washington, DC and the surrounding metro area. This
program allows the University to retain its highest caliber students. In order for students to
continue to pursue their goal of becoming a registered architect, they have to graduate from an
NAAB accredited program.

Prerequisites:

Existing 4-Year B.Sc. in Architecture or Equivalent.

Total Credit Hours Required for Graduation is 43 (See Appendix II B)

4. DIVISION OF ENVIRONMENTAL SCIENCES - REVISED

4.1. Department of Environmental Science

4.1.1. Rationale

Due to changes in environmental technology in line with increasing the complexity of environmental problems, revising the current Environmental Science Study Program at the UDC is needed to sustain the program. Shortcomings of the current degree structure include 1) lack of appropriate core courses; 2) lack of capstone courses; 3) no significant integration of new key concepts, e.g. climate change; 4) low enrollment; and 5) no visibility or low sense of program identity.

Capstone course properties:

. Students need to work on projects large enough to require teams of several students over a quarter;

. Students must apply concepts from more than one subarea of studies (at least at the 300-level);

. Engage students in a substantial laboratory studies;

. Students need to present their work using formal oral presentations and written reports; and

. Students need to produce an interesting, working artifact.

The intent of the revised curriculum is to transform the existing Environmental Science degree into an academic program that stimulates student and faculty member.s interest, increases student enrolment, engages the entire campus, and prepares students for educational opportunities and careers in the 21st century when they complete their degrees. The revised program includes General Education requirements, sustainable agriculture, natural science courses, social science courses, service learning and Environmental Science (ES) core and skill courses.

4.1.2. Overview of the revised Environmental Science Degrees

The Department of Environmental Science is an interdisciplinary unit that serves students interested in studying environment, water quality and urban sustainability. It provides hands-on training that prepares students for the 21st century.s careers. The revised program consists of three undergraduate programs and one graduate program. The undergraduate programs includes a B.S. degree in General Environmental Science, a B.S. degree in Environmental Science – Water quality and a B.S. in Environmental Science – Urban Sustainability. The graduate program is a Professional Science Master (PSM) program in Water Resource Management.

4.1.3. Career opportunities

The Environmental Science programs prepare students for advanced studies or careers in the private and public sectors as environmental scientists, water quality specialist, environmental regulator or policy maker and urban designers, to name a few. This is an interdisciplinary degree, which means graduates have an array of job choices to choose from, including becoming a hydrologist, environmental planning, green investment planning, environmental ecologist, ecological modeler, environmental chemist, conservation scientist, forester, atmospheric scientist or geoscientist. Many of these jobs are with government agencies, while others are with private firms and nonprofit organizations.

4.1.4. Job market and earnings

According to Bureau of Labor Statistics (BLS), environmental scientists and specialists in BS, MS and Ph.D. level, including health, held about 80,100 jobs in May 2008. About 45 percent of environmental scientists worked for Federal, State, and local governments. A significant portion of the remaining scientists were dispersed among management, scientific, and technical consulting services and architectural, engineering, and related services. Other environmental scientists were self-employed. Employment is projected to grow much faster than average for environmental scientists, according to BLS. Job growth will be driven by the desire to offset environmental damage caused by an increase in population. Demand for environmental scientists will also result from the need to comply with complex environmental laws and regulations.

4.1.5. Adequacy of current facilities and need of additional space (offices, classrooms, labs, etc.)

The new college, College of Urban Sustainability and Environmental Science (CUSES) needs a building where the three academic proposed divisions, the research and extension/outreach units can be housed. In addition, the current laboratory facilities, such as two water quality

laboratories located in building 44 and two new Environmental Labs in Building 42 will support
both analytical and computer lab courses. In addition, offices for faculty, staff, and research
members and classrooms for lectures are needed. Currently, there are two faculty members and
one adjunct. The projected departmental need is for an additional four faculty members and
three adjuncts. Additionally, there is a need for at least one Teaching Assistant and one Research
Assistant.

4.1.6. Adequacy of lab supplies and equipment

There will be an integration academic programs with research and extension. The academic programs will have access to research opportunities that can be provided by the Agricultural Experiment Station (AES), the DC Water Resource Research Institute (DCWRRI) and the World Rivers Institute (WRI). To date collaborative efforts between AES, DCWRRI, Department of Biology and Environmental Science and Department of Civil Engineering have resulted in establishing a state-of- the -art water quality testing laboratory for Environmental Quality and Environmental Modeling and Simulation. All labs will be equipped with state-of-the art hardware as well as software.

4.1.7. Estimated costs, available funds and probable funding sources

Costs estimates for running the proposed new college would include the general faculty, staffs and researchers salaries, student internships, office supplies and lab supplies, maintenance and repair of equipment, travel to major meetings, enhancing the research farm site, equipment purchase, etc.

The interconnectedness of research and education will allow faculty to jointly apply for and receive funding from outside sources such as NSF, USGS, USDA, DDOE, and NIH to enhance the programs. Other federal and district agencies are also potential funders.

4.1.8. Adequacy of supportive library and technical resources:

The university.s library is adequately equipped to support this program. Additional, resources to accommodate this program will be requested as needed.

4.1.9. Projected enrollment

Enrollment in the existing Environmental Science program has been low. The number of majors over the past five years are as follows: Fall 2004 – 8 majors; Fall 2005 – 11 majors; Fall 2006 – 11 majors; Fall 2007 – 10 majors; and Fall 2008 – 8 majors. The number of graduates over the past 5 years are as follows: Spring 2004 – 3; Spring 2005 – 2; Spring 2006 – 6; Spring 2007 – 1 and Spring 2008 – 5. With the revised program, projected student enrollment will be doubled for the following reasons: 1st inclusion of the capstone courses, 2nd availability of lab facilities with the opportunity of hands-on training for students, including lab exercises of interests;

3rd new qualified faculty members with extensive research experience; and 4th new
environmental challenges with new opportunities for environmental specialist, i.e., high demand
of job market.

4.1.10. Bachelor of Science Degree in Environmental Science-General

The Bachelor.s degree in general Environmental Science (ES) is a program that focuses on the
application of both pure and practical sciences and appreciation of the physical and biochemical
principles to the study of the environment and developing solutions to environmental problems,
including subjects such as abating or controlling environmental pollution and degradation in air,
water and soil; the interaction between human society and the natural environment; and natural
resources management; and environmental risk assessment. Students will take core courses of
biology, chemistry, physics and principles of ecology as a foundation for advanced course in
environmental science. The program emphasizes the critical thinking and technical skills
necessary to develop workable solutions to complex environmental problems in the 21st century.
The Environmental Science-General program is an interdisciplinary program providing
graduates with a broad range of technical, communication, analytical, and interpersonal skills,
together with a firm grounding in Environmental Science.

The purpose of the program is to provide an undergraduate education and Professional Science
Program that will prepare students to understand and meet the environmental and economic
challenges associated with growth, climate change, economic pressures, and energy production.
The proposed program will prepare students for employment in both the government sector and
environmental industries.

4.1.10.1. Overview of the New, Revised Environmental Science Degree- General

The ES degree will focus on the basic understanding of environmental systems and earth
processes, human impact on environment and connecting sound scientific understanding of
environmental policies.

During the first two years of study, students will receive general education required to pursue
Environmental Sciences Academic Program. As freshmen and sophomores, students will
complete many of the general education courses, and courses in the natural sciences, and social

sciences. Students will take considerable natural science courses appropriate for the levels of
natural sciences for preparing students for higher level courses in 3rd and 4th year.

During the last two years of studies, students will choose an interdisciplinary academic focal
areas and move to an advisor in the Environmental Sciences Faculty with the appropriate
expertise. As juniors and seniors, students will be expected to complete courses to learn about
environmental science; complete a minor or the equivalent of a minor in a focused,
interdisciplinary concentration; complete courses to acquire analytical and communication skills;
participate in an out of classroom or field and laboratory educational experience; and complete a
selection of elective courses.

Total Credit Hours of College-Level Courses Required for Graduation in B.S. in General
Environmental Science is 121 (see full curriculum in Appendix III A).

4.1.10.2. The new added capstone courses

Table 1. The new added capstone courses and course description in the Department of Environmental Science program.

#	Course title	Credit hours	Course Description
1	Sustainable Agriculture Lecture/Lab	4	This course is designed to teach students the principles of sustainable agriculture and the use of these principles in order to replace today.s agricultural practices that are dominated by high inputs of inorganic synthetic chemical fertilizers and toxic chemicals. Students will compare both the conventional and the sustainable system of agriculture and show how the sustainable system can be used to enhance productivity. Course topics includes Organic farming, energy conservation, soil and water conservation, environmental impacts of agriculture, future technology and rural and urban partnership for food security. Students are required to participate in class discussions, oral presentations, team work, field and laboratory exercises and writing assignments.
2	Environmental Toxicology Lecture /Lab	4	

An introduction to the basic principles of environmental toxicology. The course examines the impact pollutants have on the structure and function of eco-systems. Sources and fate of environmental pollutants are discussed. Students are required to participate in class discussions, oral presentations, team work, field and laboratory exercises and reviewing research papers.

3

Introduction to Data Mining

3

This will be a seminar course with lecture, student presentation of selected papers, computer lab hours and a hands-on term project. The course will examine the basic principles of data mining, contemporary data mining software tools and applications of data mining in various fields. A term project is required to apply data mining techniques to a selected problem in the student.s own discipline.

4

Climate Change and Carbon Reduction

3

An introductory course presents and explores the impact of anthropogenic activities on the global climate change and mitigation measures. Course topics include the climate system, greenhouse effect, assessing carbon foot print, carbon reduction, and science and politics of global warming and climate change impacts on the environment. The course will focus on the cause and effect of global climate change, and ways to reduce the greenhouse gas emission. Students are required to work on term projects, participate on team work, computer exercises, writing assignments and oral presentations.

5

GIS for Environmental
Management

3

This course will explore all analytical techniques applied for water and wastewater analyses
including laboratory safety procedures as well as quality control and quality assurance.
Emphasis will be on the following topics: different types of water and their utilization, water
quality criteria, and standard analytical tests in terms of water quality and pollution
assessment. Students are required to participate in class discussions, term projects, oral
presentations, team work, computer exercises and writing assignments.

6

Research Methodology

1

This course is an overview of the fundamentals of research methods applicable to the broad
field of Environmental Science. Topics include research design, quantitative and qualitative
forms of analysis, ethical issues in research, and appropriate documentation of research
processes and outcomes. Students become critical evaluators of research, with emphasis
placed on engaging the students in analytical reading of research literature in environmental
Science and the application of skills in conducting environmental research. Students are
required to conduct literature reviews, prepare research proposals and make oral
presentations.

7

Aquatic Ecology

4

This course explores the fundamentals of inland freshwater ecosystems. Topics include the formation of lakes, the physical, chemical, and biological features of the lakes and streams, and relate them to general ecological concepts and environmental concerns. The course focuses on the physiological adaptations of species to the aquatic environment, the chemistry of inland waters and processes involved in nutrient cycling, the controls of biological productivity, and aquatic community interactions. Both theoretical approaches and practical techniques are incorporated. Students are required to participate in class discussions, oral presentations, team work, field and laboratory exercises and writing assignments.

8

Water and waste water quality analysis for laboratory personnel

3

This course will explore all analytical techniques applied for water and wastewater analysis including laboratory safety procedures as well as quality control and quality assurance. It emphasis on the following topics: different types of water and their utilization, water quality criteria, and standard analytical tests in terms of water quality and pollution assessment. Students are required to participate in all field and laboratory exercises, team work, class discussions, oral presentations and writing assignments.

9

Hydrodynamics and water quality

3

An introductory course that explores a quantitative approach of describing physical, chemical, and biological processes in environment. It focuses on development of the fundamental

equations of fluid mechanics and their simplifications for several areas of surface water
hydrodynamics and the application of these principles to the solution of environmental or

water quality problems. Topics include water quality regulations, mathematical modeling of
hydraulics and water quality in stream, rivers, and wastewater treatment plants, fate and
transport of toxic organic contaminants. Students are required to participate in class
discussions, term project, oral presentations, team work, computer exercises and writing
assignments.

10

Physical geography

3

Physical Geography presents a spatial systematic view of the earth and relates certain selected
physical phenomena to the human-nature complex of the earth. These relation-ships
emphasize the roles of the physical elements in man.s environment. Topics include:
geographic tools, earth-sun relationships, atmosphere, climatic regions, lithosphere, hydro-
sphere, soils, land formation, biosphere and the geological and geophysical aspects of the
earth. Students are required to participate in class discussions, term project, oral
presentations, team work, computer exercises and writing assignments.

11

Environmental Policy

3

This course is designed to introduce the student to the institutional, regulatory and
administrative processes that manage the effects of human behavior on our natural resources.
Students will become familiar with the models of analyses as well as the various actors and
arguments as they impact policy development and implementation. Students are required to
participate in class discussions, oral presentations, team work, computer exercises and writing
assignments.

12

General Ecology

4

A study and survey of those concepts which define and explain the interrelationships between organisms and the ecosystem. With a focus on the human impact on environmental processes, the class will consider the living (biotic), non-living (abiotic), and the interdisciplinary nature of ecological problems and their resolutions. While considering sustainability and stewardship, our topics will include water resources, energy, forests, and biodiversity. Students are required to participate in class discussions, oral presentations, team work, field and laboratory exercises and writing assignments.

4.1.10.3. Probable Impact on the Unit

The revision expands the number of faculty and supporting staff. New student enrollment will also increase rapidly. The existing water quality laboratories under this unit will be utilized effectively, as all new capstone courses require a state-of the-art environmental laboratory. The revision will have a positive effect on the grant revenue and research activities. The new courses will bring new energetic young faculty with strong research experience, which will thereby increase the visibility of the unit and boost the academic Excellency of the program.

Faculty and Staff Affected

The Department of Environmental science has only two existing faculty members and one adjunct, which is not enough to cover the revised program including other three proposed programs (Water Quality, Urban Sustainability and Professional Science Master in Water Resource Management). The revision will have a significant impact on the existing faculty members in terms of motivation, attraction of the new qualified faculties, increase visibility, attraction of grant revenue, and potential professional development industry partnership.

4.1.10.4. Relationship with other programs, departments, schools or colleges

The revised program including the new program was designed in such a way that there will be synergy among the various programs and other schools in the following ways:

. Student enrolled in the department of Environmental Science division will attend the same course in the 1st, 2nd year and some courses in the 3rd year as well;
. Environmental Science is interdisciplinary and therefore the revised curriculum is tied to the different departments at UDC, such as Departments biology, chemistry, civil engineering, computer science, urban affair, language, philosophy, etc … Faculty members from those department will teach the proposed courses concurrently with the

existing schedule; and
. The curriculum is linked to the activities of key research units of the University, such as
the Agricultural Experiment Station (AES) and the DC Water Resources Research
Institute (WRRI). Available laboratory facilities in the university, such as the Computer
Science GIS and Water Quality Testing Laboratory (Building 44 Room 217- Department
of Biological and Environmental Science), the Environmental Modeling and Simulation
Laboratory (Building 42 Room 111) and the new proposed EPA certified Environmental
Quality Laboratory (Building 42 Room 110) will be shared. Qualified researchers from

the research units will serve as candidates for the proposed new faculty members required
to teach the proposed new courses.

The above mentioned synergy will increase the number of student attending the proposed
common courses, reduce the number of new faculty and required office spaces, reduce the
number of new classrooms and lab spaces needed otherwise. This synergy maximizes the
students opportunities to acquire the best theoretical as well as practical knowledge (hands-
on-training) in all capstone courses that most employers need.

4.1.11. Bachelor of Science Degree in Environmental Science-
Water Quality: NEW

The Environmental Science-Water Quality program is an interdisciplinary program, and
graduates of this program will have a broad range of technical, communication, analytical, and
interpersonal skills, together with a firm grounding in Environmental Science-Water Quality.
Students will take core courses in biology, chemistry and physics and principles of ecology as a
foundation for advanced courses in Water quality. The program emphasizes the critical thinking
and technical skills necessary to develop workable solutions to complex environmental problems
in the 21st century. The Environmental Science-Water Quality program prepares students for
advanced studies or careers in the private and public sectors as environmental water quality
specialists.

4.1.11.1. Overview of Environmental Science Degree-Water Quality

The degree programs offered by the Department of Environmental Science-
Water Quality are:

Year 1 and 2 – General education for Environmental Study Program

Freshman orientation

Philosophy

English Comp I & II

Lit & Adv Writing I & II

Social Science course

Natural Science

Environmental Science

Year 3 and 4 – Specialization

Fine arts

Foreign Language

Social Science course

Natural Science

Environmental Science

Research Methodology

Free Elective Courses

Total Credit Hours of College-Level Courses Required for Graduation in B.S. in Environmental
Science – Water Quality is 120 (see full curriculum in Appendix III B).

4.1.12. Bachelor of Science Degree in Environmental Science-
Urban Sustainability: NEW

Sustainability is a recent concept that attempts to understand how the growth of human society
threatens the future health and well-being of humans and the natural world in which we live.
Simply put, it is the ability of mankind to live harmoniously with our natural environment today,
without depleting the planet of resources for future generations.

The proposed program will introduce students to the concept of sustainability in the context of
real-world problems in an urban setting, exploring the interaction of environmental, economic
and social systems. The Urban Sustainability program is a multi-disciplinary program which will
provide students with a well rounded education. Students will be adaptable and capable of both
communicating and learning across a number of disciplines, as well as have a strong orientation
towards problem solving, analytical acumen and quantitative methods.

Coursework would fall into five broad categories:

. Social Sciences – urban planning, public policy.
. Economics – marketing, procurement, business management.
. Environmental Sciences – air quality, water quality.
. Business – Business ethics
. Natural science – biology, chemistry, mathematics, sustainability agriculture

4.1.12.1. Overview of Environmental Science Degree – Urban Sustainability

There is increasing awareness that human behavior and economic systems are having an impact
on the environment. Mounting evidence shows a strong connection between our settlement
patterns, industry and natural resource consumption that is not sustainable for future generations.

Today, for the first time in our planet.s history, more people reside in cities and developed

metropolitan regions than in rural areas. It is in our cities that solutions to the dual threat – global economic meltdown and degradation of our natural environment – can be met. A new green economy, one that addresses people and planet in a sustainable way, is emerging.

An Urban Sustainability program would help leapfrog UDC ahead of other universities within our metropolitan region to be the pre-eminent institution on sustainability. The Urban

Sustainability program will expose students to the diverse academic disciplines – social science, environmental science, economics and business - that are critical to creating solutions for these challenging times. Finally, the Urban Sustainability program will combine the knowledge, skills, and values of these disciplines with practical, hands-on experiences outside the classroom within Washington, DC and the surrounding metropolitan region.

4.1.12.2. Career Path

Graduates will be able to move on to a graduate-degree program or gain employment in areas such as:

. Local, State, and Federal Government
. Green Businesses
. Non-Profit Organizations
. Utilities
. Regulatory Agencies

The following are some sample occupations that students will be prepared for: Project Coordinator, Project Manager, Sustainability Officer, Sustainability Analyst, Sustainable Design Professional, Engineer, Environmental Research Assistant, Sustainability Consultant, Energy Efficiency Analyst, Operations Manager, Development Specialist, Resource Manager, and Policy Analyst.

Urban Sustainability graduates will also be prepared to enter into strong graduate and professional schools such as urban planning, landscape design, environmental sciences, business administration, marketing, public policy, and procurement.

Total Credit Hours of College-Level Courses Required for Graduation in B.S. in Environmental Science – Urban Sustainability is 122 (see full curriculum in Appendix III C).

4.1.13. Professional Science Master Program in Water Resource Management: NEW

4.1.13.1. Program description

Professional Science Master.s (PSM) degree is a unique (non-thesis) professional degree program designed to prepare graduates for science career in business, government or non-profit organizations. PSM degree program in Water Resource Management combines rigorous study in hydrology and hydraulics with employers oriented coursework in business, management, policy, communications or other fields – “science plus!”. This program is designed to fill a knowledge gap as well as train graduates and working professionals in the water and environmental fields with (i) interdisciplinary technical and soft skills knowledge in environmental policy and business processes, project management, waste and storm water management; and (ii) knowledge and tools required to advance into leadership roles and to shape the future of this dynamic field locally as well as internationally. This degree does not require thesis, but emphasis on internship and capstone project activities.

4.1.13.2. Mission statement

The PSM program in Water Resource Management is to provide a well-trained workforce for changing needs of society and employers in environmental protection and water resource management. The PSM degree in Water Resource Management will provide technical, scientific, mathematical and engineering skills required by a number of employers in the District of Columbia Metropolitan area.

4.1.13.3. Need statement

The complexity of water and environmental related problems is increasing and the need for well-trained water and wastewater professionals is high in the DC - metropolitan area; developing a Professional Science Master program (PSM) in Water Resource Management at the University of the District Columbia will therefore address this need.

4.1.13.4. Potential employers

Potential employers include DC Department of Environment, DC Water and Sewerage

Authority, Washington Aqueduct, regional metropolitan counties, Interstate Potomac Commission, Water and Wastewater Industries, federal agencies such as the Environmental Protection Agency (EPA), the United States Geological Survey (USGS), environmental consulting firms, and the Department of Transportation (DOT).

Appendix I A: B.S. in Nutrition & Food Science- Dietetics Option

Required Total Credit: 127

Course #	Course Description	Remark	Credit Hours
Year I			
Semester I			
1333-106	Intro to Nutrition(lec)		3
1333-104	Intro. to Nutrition(Lab)		1
8800-101			

Freshman Orientation

1

1133-111

English composition 1

3

1535-113

pre-calculus/Trigonometry 1

3

1507-111/113

General Chemistry 1, Lec and Lab

4

1105-184

Fundamentals of Art Appreciation

3

Total

Total

18

Semester II

1333-103

Intro. to Food science (lab)

1

1333-105

Intro to Food science (Lec)

3

1133-112

English composition 11

3

1507-112

General chemistry II, Lec

3

1507-114

General chemistry II, Lab

1

1333- 313

Nutrition in the Life Cycle

3

1535-114

Pre-calculus /Trig II

3

Total

17

Year II

Semester I

1401-111/113

Fundamentals of Anatomy and Physiology
I, Lec/Lab

4

1333-315/319

Community Nutrition, Lec and lab

4

1507-231/233

Organic chemistry I, Lec/lab

5

1133-211

Literature and Advanced Writing I

3

Total

16

Semester II

1401-112

Anatomy and Physiology II (lec)

3

1401-114

Anatomy and Physiology II (lab)

1

1507-232

Org-Chemistry II (Lec)

3

1507-234

Org-Chemistry II (Lab)

2

1133-212

Literature and Advanced Writing 11

3

1333-209/211

Food Processing, Lec/Lab

4

Total

16

Year III

Semester I

1507-461

Biochemistry, Lec

3

1507- 463

Biochemistry, Lab

1

1401-422

Clinical Microbiology (lec)

3

1401-424

Clinical Microbiology (lab)

1

1333-322/323

Nutrition Assessment, Lec and Lab

4

1333-320/321

Nutrition Education/Lec/Lab

4

Total

16

Semester II

1333-374

Advanced Nutrition

3

1167-105

Intro to Logic

3

1333-444

Food Chemistry, Lec

3

1333-445

Food chemistry, Lab

1

Foreign Language I

3

Social Science

3

Total

16

Year IV

Semester I

1333-421/422

Therapeutic Nutrition I Lec/Lab

4

1333-426/428

Food systems management I, Lec/Lab

3

1535-185

Elementary statistics

3

1333-374/375

Geriatric Nutrition, Lec/Lab

3

Foreign Language II

3

Total

16

Semester II

1333-490

Senior Seminar and Research

2

1333-422/424

Therapeutic Nutrition II, Lec/Lab

4

1333-
4267/429

Food Systems Management II, Lec/Lab

3

Social Science

3

Total

12

Total

127

Appendix I B: B.S. in Nutrition & Food Science- Food Science Option

Required Total Credit: 124

COURSES #	Course Title	Remark	CREDIT HOURS
Year I			
Semester I			
1421-105/103	Intro To Food Science Lec/La		4
1133-111	English Composition I		3
1535-113			

Pre-calculus w/Trig I

3

8800-101

Freshman Orientation

1

1507-111/113

Gen. Chem. I Lec/Lab

4

1105-185

Fund. Of Art Appreciation

3

TOTAL

18

Semester II

1421-106/104

Intro. To Nutrition Lec/Lab

4

1133-112

English Composition II

3

1401-101/103

Biological Sci. I Lec/Lab

4

1507-112/114

Gen. Chem. II Lec/Lab

4

SUB-TOTAL

TOTAL

15

Year II

Semester I

1421-211/209	Food Processing I Lec/Lab	4
1535-215	Calc. for Bus., Soc.& Life Sci.	4
1507-231/233	Organic Chem. I Lec/Lab	5
1133-211	Literature & Adv. Writing I	3
	TOTAL	16

Semester II

1421-212/210	Food Processing II	4
1507-232/234	Organic Chem. II Lec/Lab	5
1133-212	Literature & Adv. Writing II	3
1167-105	Intro. To Logic	3
	TOTAL	15

Year III

Semester I

1507-461/460

Biochem. I Lec/Lab

5

Social Science

3

1401-241/240

General Micro. I Lec/Lab

4

1535-247

Elementary Statistics

3

TOTAL

15

Semester II

1421-444/442

Food Chem. Lec/Lab

4

1539-101/103

Intro.College Phys I Lec/Lab

4

1421-326/325

Food Micro. Lec/Lab

4

Foreign Language

3

TOTAL

15

Year IV

Semester I

1421-415/416

Food Engineering Lec/Lab

4

1421-455/453

Food Analysis Lec/Lab

4

Social Science

3

Foreign Language

3

1421-490

Senior Seminar & Research

2

TOTAL

16

Semester II

Internship

3

1421-454/456

Food Qual. Control Lec/Lab

4

1421-325/324

Food Sanitation Lec/Lab

4

Elective

3

TOTAL

14

TOTAL

124

Free Electives Courses for Nutrition & Food Science: Food Science Option

Course Title

Credit hours

xxxx-xxx

Sustainable Agriculture lecture/lab

4

1415-450/451

Environmental Health

4

xxxx-xxx

Urban Sustainability

3

xxxx-xxx

Environmental Policy

3

Appendix I C: M.S. in Nutrition

Required Total Credit: 32

Course #	Course Title	Remarks	Credit
PSYC 534	Group Design and Intervention		3
NFSC 501	Nutritional Epidemiology		2
URST 515	Politics: Public Policy and Health Issue		3
PMGT 519	Public Policy Development and Implementation		3
MATH 551	Probability and Statistics		3
NFSC 520			

Medical Nutrition Therapy III

3

NFSC 530

Pharmacology for Nutrition Professionals
Medical Nutrition Therapy IV

3

MMED 521

Mass Media for Public Administration

3

2213 511

Leadership in Organizations

3

NFSC 650

Nutrition Research Methods/Thesis

2

BIOL 690

Molecular Biology (Lec)

3

BIOL 691

Molecular Biology (Lab)

1

TOTAL

32

Appendix II A: B.S. in Architecture

Required Total Credit: 128

Course #	Course Name	Credit Hrs
Year 1		
Semester 1		
3503-101	Basic Design and Communication I	3
3505-114	Materials & Methods of Const. I	3

3505-105

Intro to Computer Tech I

3

1133-111

English Composition I

3

8800-101

Freshman Orientation

1

1535-111

Technical Mathematics I

4

TOTAL

17

Semester 2

3505-102	Basic Design and Communication II	3
3505-116	Materials and Methods of Const. II	3
3505-106	Intro to Computer Tech II	3
1133-112	English Composition II	3
1535-112	Technical Mathematics II	4
TOTAL		16

Year 2

Semester 1

3505-244

Environmental Systems I

3

3505-341

Advanced Comp. Simulation

3

3505-201

Architectural Studio I

4

3505-232

Statics and Structural Design

3

1539-101

Intro to College Physics I/Lec

3

1539-103

Intro to College Physics I/Lab

1

TOTAL

17

Semester 2

3505-202

Arch Studio II

4

3505-206

CAD COCS/Specs and Estimating

3

3505-246

Environmental Systems II

3

3505-256

The Built Environment

3

1539-102

Intro to College Physics II/Lec

3

1539-104

Intro to College Physics II/Lab

1

TOTAL

17

Year 3

Semester 1

6505-301

Architectural Studio III

5

6505-321

History & Theory of Architecture I

3

Social Science Elective

3

3513-231

Theory of Structures

3

1133-211

Literature & Advanced Writing I

3

TOTAL

17

Semester 2

6505-302

Architectural Studio IV

5

6505-322

History and Theory of Architecture II

3

3513-232

Design of Steel Structures

3

Social Science Elective

3

1133-212

Literature & Advanced Writing II

3

TOTAL

17

Year 4

Semester 1

3505-401

Architectural Studio V

5

3505-411

Professional Ethics & Practice

3

Elective

3

Philosophy Elective

3

TOTAL

14

Semester 2

6505-402`

Architectural Studio VI

5

3513-434

Design of Concrete Structures

3

Elective

2

Fine Arts Elective

3

TOTAL

13

TOTAL

Appendix II B: M.S. in Architecture

Required Total Credit: 43

M.S. in Architecture

Course #

Course Titles

Remarks

Credit

Semester I

3505-501

PROF. STUDIO LAB IX

5

3505-***

URBAN & COMM. DESIGN I

3

3505-413

PRESERVATION REHAB. TECH

3

3505-505

SUSTAINABLE DESIGN I

3

ELECTIVE

3

Total

17

Semester II

3505-502

PROF. STUDIO X

5

3505-***

URBAN & COMM. DESIGN II

3

3505-506

SUSTAINABLE DESIGN II

3

3505-414

PROF. ETHIC & PRACTICE II

3

ELECTIVE

3

TOTAL

17

Semester III

3505-505-

PRESERVATION REHA. TECH. I

3

ELECTIVE

3

ELECTIVE

3

TOTAL

9

TOTAL

43

Appendix III A: B.S. in Environmental Science-General

Required Total Credit: 121

Course #	Course Title	REMARK	Credit Hours
Year I			
Semester I			
8800-101	Freshman Orientation		1
1133-111	English Composition I		3
1401-101			

Biology science I Lecture

3

1401-102

Biological science I Laboratory

1

1507-111

General Chemistry I lecture

3

1507-113

General Chemistry I lab

1

1535-113

Pre-Cal with Trig I

3

TOTAL

15

Semester II

1133-111

English Composition II

3

1507-112

General Chemistry II

3

1507-114

General Chemistry II Lab

1

1535-114

Pre-Cal with Trig II

3

3528 104

Intro to Computer Applications Lecture

2

3528 105

Intro to Computer Applications Laboratory

1

1161-104

World Physical Geography

3

TOTAL

16

Year II

Semester I

1133-211

Literature and Advance Writing I

3

1415-145

Intro To Environmental Science Lecture

3

1415-146

Intro To Environmental Science
Laboratory

1

1167-105

Philosophy: Intro to logic

3

1507-231

Organic Chemistry I

3

1507-233

Experimental organic Chemistry I

2

TOTAL

15

Semester II

1133-212

Literature and Advance Writing II

3

1507-232

Organic Chemistry II

3

1507-234

Experimental Organic Chemistry II

2

xxxx-2xx

General Ecology Lec

3

xxxx-2xx

General Ecology Lab

1

1415 247

Environmental Statistics

3

TOTAL

15

Year III

Semester I

xxxx-xxx

Fine arts

3

xxxx-xxx

Sustainable Agriculture lecture

3

xxxx-xxx

Sustainable Agriculture Lab

1

3529-490

Introduction to Data Mining

3

xxxx-xxx

Foreign Language I

3

TOTAL

13

Semester II

1415-3xx

Environmental Toxicology Lecture

3

1415-3xx

Environmental Toxicology Lab

1

1179-335

Urban Political Economy

3

1450-324

General Soils Lecture

3

1450-325

General Soil lab

1

xxxx-xxx

Foreign Language II

3

XXXX-XXX

Electives

3

TOTAL

17

Year IV

Semester I

xxxx-xxx

Research Methodology

1

1167-470

GIS for Environmental Management

3

1415-452

Air Pollution Lecture

3

1415-453

Air Pollution Lab

1

1415-450

Environmental Health Lecture

3

1416-451

Environmental Health Laboratory

1

xxxx-xxx

Elective

3

TOTAL

15

Semester II

xxxx-4XX

Climate Change and Carbon reduction

3	xxxx-xxx	Environmental Policy
3	xxxx-4XX	Senior project
3	xxxx-4XX	Elective
6		
15	TOTAL	

Total

121

Free Electives Courses for ES: General- Requirement 12 Credit

Course Title	Credit hours
xxxx-xxx Aquatic Ecology	4
xxxx-xxx Water and waste water quality analysis for laboratory personnel	3
xxxx-xxx Hydrodynamics and water quality	3
1161-470 Advance Desktop GIS	3
1333-322/323 Nutrition analysis lab and lecture	

4

1421-453/455

Food analysis lab and lecture

4

Appendix III B: B.S. in Environmental Science - Water Quality

Required Total Credit: 120

Course #	Course Title	REMARKS	Credit Hours
Year I			
Semester I			
8800-101	Freshman Orientation		1
1133-111	English Composition I		3
1401-101			

Biological Science I Lecture

3

1401-102

Biological Science I Laboratory

1

1507-111

General Chemistry I lecture

3

1507-113

General Chemistry I lab

1

1535-113

Pre-Cal with Trig I

3

TOTAL

15

Semester II

1133-111

English Composition II

3

1507-112

General Chemistry II

3

1507-114

General Chemistry II Lab

1

1161-104

World Physical Geography

3

1535-114

Pre-Cal with Trig II

3

3538-104

Intro to Computer Applications Lecture

2

3538-
105

Intro to Computer Applications Laboratory

1

TOTAL

16

Year II

Semester I

1133-211

Literature and Advance Writing I

3

1507-231

Organic Chemistry I

3

1507-233

Experimental organic Chemistry I

2

1415-145

Intro To Environmental Science Lecture

3

1415-146

Intro To Environmental Science Laboratory

1

1167-105

Philosophy: Intro to logic

3

TOTAL

15

Semester II

1133-212

Literature and Advance Writing II

3

1417-221

Wastewater Technology Lec

3

1417-223

Wastewater Technology Lab

1

1507-232

Organic Chemistry II

3		
1507-234		
Experimental organic Chemistry II		
2		
1415-247		
Environmental Statistics		
3		
TOTAL		
15		

Year III

Semester I

xxxx-xxx

Fine arts

3

xxxx-xxx

Sustainable Agriculture lecture

3

xxxx-xxx

Sustainable Agriculture Lab

1

3529-490

Introduction to Data Mining

	3	
	xxxx-xxx	
	Foreign Language I	
	3	
	TOTAL	
	13	

Semester II

	1179-335	
	Urban Political Economy	
	3	
	1415-3xx	
	Environmental Toxicology Lecture	
	3	
	1415-3xx	
	Environmental Toxicology Lab	

1	3509-325	Hydrology & Hydraulics
3	xxxx-xxx	Foreign Language II
3		
TOTAL		
13		

Year IV

Semester I

xxxx-xxx

Research Methodology

1

1161-475

Urban and Environmental GIS

3

xxxx-4xx

Hydrodynamics and water quality

3

1415-450

Environmental Health Lecture

3

1415-451

Environmental Health Laboratory

1

xxxx-xxx

Electives

6

TOTAL

17

Semester II

1415-xxx

Aquatic Ecology lecture

3

1415-xxx

Aquatic Ecology Lab

1

xxxx-xxx

Environmental Policy

3

xxxx-xxx

Senior Project

3

xxxx-xxx

Internship

3

xxxx-xxx

Elective

3

TOTAL

16

Total

120

Free Electives Courses for ES-Water Quality: Requirement 9 Credit

Course Title	Credit hours
xxxx-xxx Water and waste water quality analysis for laboratory personnel	3
xxxx-xxx Climate Change and Carbon reduction	3
1161-470 Advance Desktop GIS	3
1415-452 Air Pollution Lecture & lab	4
1333-323/323 Nutrition analysis lab and lecture	

4

1421-453/455

Food Analysis lab and lecture

4

Appendix III C: B.S. in Environmental Science – Urban Sustainability

Required Total Credit: 122

Course #	Course Title	REMARK	Credit Hours
Year I			
Semester I			
8800-101	Freshman Orientation		1
1133-111	English Composition I		3

1401-101

Biology science I Lecture

3

1401-102

Biological science I Laboratory

1

1507-111

General Chemistry I lecture

3

1507-113

General Chemistry I lab

1

1535-113

Pre-Cal with Trig I

3

TOTAL

15

Semester II

1133-111

English Composition II

3

1507-112

General Chemistry II

3

1507-114

General Chemistry II Lab

1

1535-114

Pre-Cal with Trig II

3

3528 104

Intro to Computer Applications Lecture

2

3528 105

Intro to Computer Applications

Laboratory

1

1161-104

World Physical Geography

3

TOTAL

16

Year II

Semester I

1133-211

Literature and Advance Writing I

3

1415-145

Intro To Environmental Science Lecture

3

1415-146

Intro To Environmental Science
Laboratory

1

1167-206

Philosophy: Intro to Logic

3

1507-231

Organic Chemistry I

3

1507-233

Experimental organic Chemistry I

2

TOTAL

15

Semester II

1415 247

Environmental Statistics

3

1133-212

Literature and Advance Writing II

3

1507-232

Organic Chemistry II

3

1507-234

Experimental Organic Chemistry II

2

xxxx-2xx

General Ecology Lecture

3

xxxx-2xx

General Ecology Lab

1

TOTAL

15

Year III

Semester I

xxxx-xxx

Foreign Language I

3

xxxx-xxx

Sustainable Urban Agriculture lecture

3

xxxx-xxx

Sustainable Urban Agriculture Lab

1

xxxx-xxx

Fine arts

3

1179-205

Urban Government

3

TOTAL

13

Semester II

xxxx-xxx

Foreign Language II

3

2213-319

Business Ethics

3	xxxx-xxx	Urban Sustainability
3	1179-335	Urban Political Economy
3	xxxx-xxx	Electives
3		
TOTAL		
15		

Year IV

Semester I

xxxx-xxx

Research Methodology

1

1161-475

Urban and Environmental GIS

3

1415-452

Air Pollution Lecture

3

1415-453

Air Pollution Lab

1

1415-450

Environmental Health Lecture

3

1416-451

Environmental Health Laboratory

1

1179-405	Urban Policy Analysis	3
xxxx-xxx	Electives	3
	TOTAL	18

Semester II

xxxx-4XX	Climate Change and Carbon reduction	3
xxxx-xxx	Environmental Policy	

3

xxxx-4XX

Senior project/ internship

3

xxxx-4xx

Internship

3

xxxx-4XX

Elective

3

TOTAL

15

Total

122

Free Electives Courses for ES: Requirement 9 Credit

Course Title	Credit hours
xxxx-xxx Environmental Toxicology	4
3509-325 Hydrology and hydraulics	3
1161-470 Advance GIS	3
xxxx-xxx Hydrodynamics and water quality	3
1333-322/323 Nutrition analysis lab and lecture	4
1421-453/455 Food analysis lab and lecture	

Appendix III D. Professional Science Master Degree in Water Resource Management

Required Credit Hours 35

Curriculum

Educational requirements:

B.S. degree in natural science and related fields or B.A. degree in social science with 3 prerequisite
courses of at least 24 Credit Hours in total in Natural Science Courses: Math and Physics (8 Credit hours),
Biology (8 Credit hours), Chemistry (8 Credit hours). It also requires basic knowledge of information
technology.

Programs (35 CRD):

- Hydroscience Courses 12 CRD
- Complementary Courses 12 CRD
- „Plus. Courses 07 CRD
- Internship/capstone project 04 CRD

Complementary Courses (Required 12 CRD):

- Statistics and Data Mining 3 CRD
- GIS and Remote Sensing 3 CRD
- System Approach and Project Management 3 CRD
- Environmental Impact Assessment 3 CRD

Hydroscience (Required 12 CRD)

- Water Quality Assessment, Monitoring & Treatment 3 CRD
- Surface & Ground Water Hydrology 3 CRD
- Water Quality Modeling 3 CRD
- Stream Restoration 3 CRD

"Plus" Courses (Required 7 CRD):

- Advanced Public Human Resources Management (Elective) 3 CRD
- Public Communication for STEM Professionals (Elective) 3 CRD
- Ethics, Responsible Conduct of Research and Professional Responsibility 1 CRD

Internship/capstone project (4 CRD)

- Internship 3 CRD
- Capstone Seminar 1 CRD

Year 1

Semester I

- Water Quality Assessment, Monitoring & Treatment 3 CRD
- Research Method, Statistics and Data Mining 3 CRD
- Surface & Ground water Hydrology 3 CRD

Semester II

- Public Communication for STEM Professionals 3 CRD
- Environmental Impact Assessment: Integrated project 3 CRD
- Ethics, Responsible Conduct of Research and Professional responsibility 1 CRD
- GIS 3 CRD

Year II

Semester I

- The Systems Approach and Project Management 3 CRD
- Stream Restoration 3 CRD
- Water Quality Modeling 3 CRD

Semester II

- Internship 3 CRD
- Advanced Public Human Resources Management 3 CRD
- Capstone Seminar 1 CRD

Course Description

#	Course title	Credit hour	Course Description
1	Water Quality Assessment, Monitoring & Treatment - NEW	3	This course is designed to teach students the principle and practical aspect of Water Quality Assessment, Monitoring and Treatment. It will explore the definite (water quantity) and indefinite (water quality), characteristics of water, including water quality standards, water quality monitoring, water quality assessment tools, regulations and the basics of water and wastewater treatment processes and their limitations in the context of integrated river water management requirements.
2	Surface & Ground water Hydrology - NEW	3	This course concentrates on the quantification of surface and groundwater hydrological processes. An understanding of rainfall, evapotranspiration, runoff, groundwater recharge, groundwater storage, groundwater movement and the engineering and/or management of the water environment. This course provides a conceptual and quantitative understanding of hydrology and the basic principles of hydraulics as a basis for later applied studies of water quality, water engineering, and water management.
3	Water Quality		

Modeling -
NEW

3

This course is designed to give graduate level students an overview of water quantity and quality aspects of surface water characteristics and the analytical methods used in the development of water quality models and the application of these models to stream and river systems, lakes and reservoir systems and estuaries. Mathematical conceptualization and formulation of physical, chemical, biological, and hydrological water quality constituent transport and fate mechanisms will be discussed in depth. Considers the origin, behavior, and fate of nutrients and toxic substances in rivers, lakes and estuaries.

4

Statistics-1535
586 Design of
Experiments &
Analysis of
Variance

3

This course is designed to provide water resource graduates a fundamental knowledge and practical understanding of common techniques of data processing in hydrology and water quality modeling. This allows the students to select and apply most appropriate techniques to summarize and organize data. It also allows them to have an insight in the limitations of data collection and the corresponding

consequences for water management and engineering.

5

GIS for Water Resource Management- NEW

3

This course will equip the student with a set of spatial data management and analysis tools, which can be applied to different water resources problems. The course will focus on the principle and application of Geographical Information System to the water resource management.

6

Stream Restoration - NEW

3

This course is designed to provide a technical understanding of the theoretical and practical principle of stream restoration used to return an impaired or degraded river corridor ecosystem to a close approximation of its remaining natural potential. The course explores the scientific basis of stream restoration programs through interdisciplinary theories and practice and presents principles of hydrology, sedimentation engineering, geomorphology, and ecology relevant to the design and evaluation of stream restoration projects. Students will be exposed to a variety of stream restoration concepts through lectures, seminars, field trips, and independent project assessments.

7

2213 509 The Systems Approach and Project Management – Existing

3

Examines management, the systems concept and matrix management; project planning, organization, staffing, direction, and control; project management authority; project budgeting and cost analysis; project implementation and evaluation.

8

2215 504
Advanced
Public Human
Resources
Management –
Existing

3

Covers management of human resources in public agencies, changing conditions affecting employment policies, selection procedures and promotions. Examines the issues relating to testing and selection, productivity, incentives, union-management relations, supervisory relationships, political participation, minority employment, upward mobility, affirmative action, employee development and training.

9

Environmental
Impact
Assessment:
Integrated

3

This course is designed to provide a critical overview of the theory and practice of Environmental Impact Assessment (EIA). Students will learn a basic principles of environmental impact assessment and environmental impact reports in class. Then student will practice how to conduct

project - NEW

environmental impact assessment and write environmental impact statements or reports. It requires team work, literature study, writing reports and oral presentations.

10

Capstone Seminar: Existing

1

A seminar series on topics related to principles, techniques and applications of capstone courses. It is meant to expose students to current research and developments in the rapidly advancing fields.

11

Public Communication: Existing

3

This course is designed to provide an in-depth exploration of the many theoretical, methodological, and applied aspects of environmental communication and to put those understandings into action with the creation of an environmental communication campaign related to, for example, communicating global climate change.

12

Ethics, Responsible Conduct of Research and Professional Responsibility - NEW

1

This course is designed to explore ethical rules and constraints to provide students with an understanding of the standards of professional responsibility. Through a case-based approach, students will consider various ethical issues within the often competing demands imposed by the operation of the “rule of law” and concerns for public safety & security.

13

Internship -
NEW

3

Supervised work-and-learning experience in water resource management under the direction of a University faculty member and an employee of a participating firm. Ten to 20 hours a week of student times are expected during the academic year; 20 to 40 hours a week are expected during a five-week summer term. The internship program will have students involved in data collection, analysis and interpretation, field and/or laboratory experiences and writing reports.

Professional Science Master (PSM) Program in

Water Resource Management

College of Urban Sustainability and Environmental Science

University of the District of Columbia

Course Syllabus

Course Title: Water Quality Assessment, Monitoring & Treatment

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Course Description

This course is designed to teach students the principles and practical aspect of Water Quality Assessment,
Monitoring and treatment. It will explore the definite (water quantity) and indefinite (water quality)
characteristics of water, including water quality standards, water quality regulation, and basics of water
and wastewater treatment processes and their limitations in the context of integrated river water
management requirements. The students will learn selection and use of computer models for water quality
and should understand the limitations of such models.

Rationale

This course is required for water resource majors as basic knowledge and deep insight of water quality
monitoring, water quality data assessment and interpretation, and water and waste water treatment
technologies required by the employers.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire
better scientific understanding of water quality assessment, monitoring and wastewater treatment.

Learning Outcomes

Upon completion of the course, students will have the knowledge and skills to:

- Conduct basic water quality sampling and analysis for drinking water quality as well as
wastewater quality.
- Determine key water quantity and water quality parameters
- Understand the principles and practices of biological wastewater treatment processes
- Apply mathematical models or information technology in assessing and predicting
water quality
- Distinguish the need of advance wastewater treatment process as compared to
conventional activated sludge model

Required text book

. Water quality assessments: a guide to the use of biota, sediments, and water, 2nd edition. By
Deborah V. Chapman, 1996; free downloadable at
http://www.who.int/water_sanitation_health/resourcesquality/watqualassess.pdf
. Theory and Practice of Water and Wastewater Treatment by Ronald L. Droste, 1997

Suggested reading

. Oregon Plan for Salmon and Watersheds Water Quality Monitoring Guidebook,
http://www.oregon.gov/OWEB/docs/pubs/wq_mon_guide.pdf
. Water pollution control: A Guide to the Use of Water Quality Management Principles, Edited
by R. Helmer and I. Hespanhol
http://www.who.int/water_sanitation_health/resourcesquality/watpolcontrol.pdf
. Restoring Streams in Cities: A Guide for Planners, Policymakers, and Citizens, by Ann Riley,
1997
. Water Quality Monitoring, Jamie Bartram, Richard Balance, 1996, ISBN: 0419217304/
ISBN-13: 9780419217305
. Quality Assessment of Water and Wastewater, by Mamta Tomar, 1999. CRC Press LLC
. Water Quality Monitoring, a Practical Guide to the Design and Implementation of freshwater
Quality Studies and Monitoring Programs by Richard Balance Jamie Bartram, 1996
. Practical Wastewater Treatment, by David L. Russell, 2006

Course content

1. Introduction
2. Water quality criteria
3. Water quality assessment tools
a. Water quality monitoring
b. Water quality modeling

4. Data analysis: quality control and quality assurance
5. Surface water: River, Lake, Reservoir and Estuary
6. Ground water

7. Wastewater as a resource
8. Elements of Biological wastewater treatment
9. Activated sludge model application to wastewater quality assessment
10. Pre-treatment & Primary Wastewater Treatment Processes
11. Secondary Wastewater Treatment Processes
12. Tertiary Wastewater Treatment Processes
13. Advanced Water Treatment Technologies

Teaching Methods

Teaching methods will include but not limited to: lectures, discussions, field and laboratory exercises,
library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-
point scales.

Attendance and class participation: Students are required to attend all lecture and computer
exercise which accounts for 5% of the final grade.

Written Assignments: Student will be required to read three latest research articles relevant to the course content, and three page critique of the articles on the basis of the hypothesis tested, methodology applied, result summarized, and further recommendation. The written assignment will account for 10% of the grade.

Computer Technology Assignments: Student will be required participate on the computer exercise and prepare a PowerPoint Presentation to the class. This assignment requires team work, and it accounts for 10% (including 5% PowerPoint presentation) of the overall grade.

Laboratory Exercises: Students will take environmental samples and analyze water quality parameters either on site if possible or in the laboratory. The following lab exercises are required:

1. pH, Turbidity, and Conductivity
2. Solids
3. Hardness, Chloride
4. Acidity, Alkalinity
5. Chemical Oxygen Demand
6. Phosphorus
7. Nitrogen
8. Biological indicators

Field Trip: There will be a filed trip to Drinking Water and Wastewater Treatment Facilities, and state-of- the-art environmental quality laboratory located in the Washington DC metropolitan area. Students will also take samples from the stream and analyze the physical, chemical and biological quality of the stream. Laboratory trips highlights more elaborate tests not covered in the above listing of laboratory exercises. Among these are tests using gas chromatography/mass spectrometry for determination of organic pollutants, atomic absorption spectrometry, or inductively coupled plasma machines for metals determination.

Assessment Criteria in 100% - point scale:

Class participation 5%

Lab report 15%

Homework Assignments: 10%

Computer Exercise 10%

Midterm 30%

Final Exam 30%

Total 100%

Attendance Policy

Attendance is expected at all sessions. The instructor should be notified as soon as an absence is expected
or as soon after the absence as possible. Missed exams are made up at the discretion of the instructor. Late
student work is accepted only when approved prior to the due date.
Schedule of exams and quizzes are on
the schedule for the course (distributed separately).

University Compliance

Sexual Harassment and Racial Harassment Policy Statement

It is the policy of the University of the District of Columbia that all acts of sexual harassment and racial harassment of its students, faculty, staff and applicants for employment to the University is prohibited.

The University will provide work sites and classrooms free of sexual harassment and monitor conditions so that instances of sexual harassment are prevented or detected soon after their occurrence. The University will examine impartially all complaints of sexual harassment and attempt to resolve them as promptly as possible.

Equal Employment Opportunity and Affirmative action

The University of the District of Columbia actively subscribes to a policy of equal opportunity in education and employment, and will not discriminate against any person in recruitment, examination, training, promotion, retention, disciple or any other aspect of employment and education administration because of race, age, color , sex, physical or mental disability, martial status, religion national origin, political affiliation, personal appearance, sexual orientation, matriculation, source of income, place of residence, familial status, or family responsibilities, in accordance with he provisions of the D.C. Human Rights Act of 1977 (D.C. Law 2-38). Vietnam War Veterans and disabled veterans are also covered under this policy.

Filing a Complaint

Persons who believe they have been discriminated against (including sexual harassment) may file a

complaint by contacting the EEO/AA Coordinator in the Office of Human Resources in Building 38,
Suite 301-4, telephone: (202) 274-5052.

The Americas with Disabilities Act (ADA)

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act
(ADA) of 1990, no otherwise qualified student with a disability shall, solely because of her/his disability,
be excluded from participation in, be denied benefits of, or be subjected t discrimination under any
program or activity of the University, including facilities and employment.

The Family Education Rights and Privacy Act (FERPA)

The Family Education Rights and Privacy Act of 1974, as amended, known as FERPA, is a federal law
that protects the privacy of student education records that are directly related to the student and are
maintained by the University.

Under FERPA, students are given certain rights regarding education records:

. The right to inspect and review education records kept by the University.
. The right to request the amendment of education records the student believes to be inaccurate,
misleading or otherwise in violation of his or her privacy rights.
. The right to consent to disclose directory information, except to the extent that FERPA and
the regulations authorize disclosure without consent.

. The right to file with the U.S. Department of education a complaint concerning alleged failures by the institution to comply with the requirements and regulations of FERPA. The complaint should be in writing and contain specific allegations of fact. The complaint should be sent to:

Family Policy Compliance Office

U.S. Department of Education

400 Independence Avenue, SW

Washington, D.C. 20202-4605

Academic Integrity Policy

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Cheating includes the actual giving or receiving of any unauthorized aid or assistance or the actual giving or receiving of any unfair advantage on any form of academic work. Plagiarism is the use of another.s ideas or words, or both, as if they were one.s own. However, ideas or direct quotations from others are acceptable with appropriate citation of source.

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UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: Surface and Ground Water Hydrology

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Course description

This course concentrates on the quantification of surface and groundwater hydrological processes. An
understanding of rainfall, evapotranspiration, runoff, groundwater recharge, groundwater storage, and
groundwater movement is essential for those involved in the science, engineering or management of the
water environment. This module provides a conceptual and quantitative understanding of hydrology and
the basic principles of hydraulics as a basis for later applied studies of water quality, water engineering,

and water management.

Course rationale

This course is required for water resource graduates, as an understanding of the ground water and surface
water hydrological processes, such as rainfall, evapotranspiration, runoff, groundwater recharge,
groundwater storage, and groundwater movement which is essential for the water resource science,
engineer or manger.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire
apply scientific understanding of surface and ground water hydrology.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

. Develop a hydrologic budget for a water body;
. Describe the physical principles of, estimate, measure, and model the main components of a
hydrologic budget, including precipitation, evapotranspiration, infiltration, overland flow, stream
flow, and groundwater recharge.
. Assess human impact on the hydrological cycle

Course Contents

1. Introduction to hydrology
2. Hydrological cycle
3. Precipitation
4. Infiltration and soil water processes
5. Evapotranspiration
6. Runoff and subsurface drainage
7. Stream processes
8. Uniform open channel flow
9. Hydraulic control structures
10. Soil conservation and sediment budgets
11. Forest hydrology
12. Hydrogeology
13. Human impact on the hydrologic cycle: Prevention and Treatment strategies
14. Fundamentals of remote sensing and geographic information systems

Required text book:

Environmental Hydrology, Second Edition, by Andy D. Ward, Stanley W. Trimble, 2003. ISBN: 1-56670-616-5

Handouts from instructor

Required reading:

. Practical Problems in Groundwater Hydrology Scott Bair, Ohio State University Terry D Lahm, Capital University, ISBN-10: 0131456679, 2006
. McCuen, R.H. Hydrologic Analysis and Design, Prentice Hall, 2005.

Teaching method

Teaching methods will include but not limited to: lectures, discussions, field and computer exercises,

library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-
point scales.

Attendance and class participation: Students are required to attend all lecture and computer
exercise which accounts for 5% of the final grade.

Written Assignments: Student will be required to read three latest research articles relevant to
the course content, and three page critique of the articles on the basis of the hypothesis tested,
methodology applied, result summarized, and further recommendation. The written assignment
will account for 10% of the grade.

Computer Technology Assignments: Student will be required participate on the computer
exercise and prepare a PowerPoint Presentation to the class. This assignment requires team work,
and it accounts for 10% (including 5% PowerPoint presentation) of the overall grade.: Students
are required to submit all written assignment on time.

Field and computer exercises:

1. Stream flow measurement
2. Rainfall runoff analysis using SWWM
3. Groundwater quantity and quality analysis using MODFLOW

Assessment in 100% - point scale:

Class attendance 5%

Mid term Exams 35%

Final Exam 40%

Written Assignment 10%

Field & Computer Exercises 10%

Total Semester Grade 100%

Attendance Policy

Attendance is expected at all sessions. The instructor should be notified as soon as an absence is expected
or as soon after the absence as possible. Missed exams are made up at the discretion of the instructor. Late
student work is accepted only when approved prior to the due date. Schedule of exams and quizzes are on
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Under FERPA, students are given certain rights regarding education records:

. The right to inspect and review education records kept by the University.
. The right to request the amendment of education records the student believes to be inaccurate, misleading or otherwise in violation of his or her privacy rights.
. The right to consent to disclose directory information, except to the extent that FERPA and the regulations authorize disclosure without consent.

. The right to file with the U.S. Department of education a complaint concerning alleged failures by the institution to comply with the requirements and regulations of FERPA. The complaint should be in writing and contain specific allegations of fact. The complaint should be sent to:

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Cheating includes the actual giving or receiving of any unauthorized aid or assistance or the actual giving or receiving of any unfair advantage on any form of academic work. Plagiarism is the use of another.s ideas or words, or both, as if they were one.s own. However, ideas or direct quotations from others are acceptable with appropriate citation of source.

Students are subject to dismissal from a degree program for unethical practices and acts of academic dishonesty. It should also be noted that a plea of ignorance of the policy will not be accepted. The prescribed policies and procedures that pertain to violation of the academic integrity policy are contained in the Student Handbook.

UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: Water Quality Modeling

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Course description:

This course is designed to give graduate level students an overview of water quantity and quality aspects
of surface water characteristics and the analytical methods used in the development of water quality
models, and the application of these models to stream and river systems, lake and reservoir systems and
estuaries. Mathematical conceptualization and formulation of physical, chemical, biological, and
hydrological water quality constituent transport and fate mechanisms will be discussed in depth. This

course also considers the origin, behavior, and fate of nutrients and toxic substances in rivers, lakes and
estuaries.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire
better scientific understanding of water quality modeling and its application.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

. Describe hydrologic and hydraulic principles required to apply water quality model
. Recognize fundamental of pollutant transfer in the environment
. Distinguish different modeling approaches related to point and non-point source pollution
. Apply appropriate water quality model for the right water quality assessment
. Develop basic water quality model and apply it to water quality prediction.

Course Content:

1. Introduction to mathematical models
2. Hydrology and hydraulics
3. Reaction kinetics
4. Basic water quality equation: Mass balance

5. Control volume-Steady state solution
6. Diffusion and dispersion- Time variable solution
7. Modeling environment
8. Rivers and Streams water quality modeling
9. Water quality modeling in Estuary
10. Water Quality modeling in Lakes and Impoundments
11. Modeling environment
12. Dissolved Oxygen
13. Eutrophication and temperature
14. Toxics

Required text book:

. Surface Water-Quality Modeling by Steven C. Chapra (Paperback) - December 31, 2008.

Recommended reading

. Principles of Surface Water Quality Modeling and Control Robert V. Thomann and John A.
Mueller, Prentice Hall Hardcover, 1997, ISBN 0-06-046677-4
. Chapra, S. (1997) Surface Water-Quality Modeling, Waveland Press
. Hydrodynamics and Water Quality: Modeling River, Lake and Estuary by Zhen-Gang Ji,
2008.
. Hydrodynamics and transport for water quality modeling By James Lenial Martin, Steve C.
McCutcheon, Robert W. Schottman, 1999,
. Water quality modeling for wasteload allocations and TMDLs By Wu-Seng Lung, 2001

Teaching method

Teaching methods will include but not limited to: lectures, discussions, field and computer exercises,
library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-
point scales.

Attendance and class participation: Students are required to attend all lecture and computer
exercise which accounts for 5% of the final grade.

Written Assignments: Student will be required to read three latest research articles relevant to
the course content, and three page critique of the articles on the basis of the hypothesis tested,
methodology applied, result summarized, and further recommendation. The written assignment
will account for 10% of the grade.

Computer Technology Assignments: Student will be required to participate on the computer
exercise and prepare a PowerPoint Presentation to the class. This assignment requires team work,
and it accounts for 10% (including 5% PowerPoint presentation) of the overall grade.: Students
are required to submit all written assignment on time.

Assessment in 100% - point scale:

Class participation 05%

Written Assignment 10%

Computer Exercises 10%

Mid term Exam 35%

Final Exam 40%

Total 100%

Grading Criteria: A: 90 and above

B: 80-89

C: 70-79

D: 60-69

F: 59 and below

Attendance Policy

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UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: GIS for water resources management

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Course description

This course will equip the student of water resource management with a set of spatial data management
and analysis tools, which can be applied to different water resources problems. The course will focus on
the principles and applications of Geographical Information System to the water resource management.

Course Rationale

GIS for Water Resource Management course is designed to provide the students with an understanding of the methods and theories of spatial analysis and data management that will allow students to apply GIS knowledge and skills to water resources problems and management.
This course is a program requirement for the Master of Science in Water Resources Management degree majors.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire scientific understanding of Geographical Information System and its application as a tool for water resource management.

Learning Outcomes

Upon successful completion of the course, students will have the knowledge and skills to:

- Analyze a water resources problem with the help of GIS.
- Apply GIS to hydro networks
- Apply GIS for drainage system analysis
- Process a Digital Elevation Model drainage delineation

Required text book

John G. Lyon, 2003 .GIS for Water Resource and Watershed Management. ISBN-0-20327-349-4

Required reading materials

Garbrecht, J., Martz, L.W., (2000). Digital Elevation Model Issues in Water Resources Modeling. in
Hydrologic and Hydraulic Modeling Support with Geographic Information Systems (2000) ESRI
Press

Greene, R.R., 2002. Confronting Catastrophe: A GIS Handbook. ESRI Press. ISBN 1-58948-040-6

Maidment, D.D., 2002. Arc Hydro: GIS for water resources. ESRI Press.ISBN 1-58948-034-6

Course content

1. Introduction to GIS application
2. Terrain analysis
3. Application of GIS to hydro networks
4. Define the role of Digital Elevation Models in water resource management
5. Prepare a DEM for use in water resource analysis
6. Process a DEM drainage delineation
7. Apply GIS to drainage system analysis
8. Apply GIS to river channel analysis
9. Apply GIS to Hydrograph
10. Application of GIS to watershed assessment

Teaching methods

This course will be taught with a combination of lectures, lab exercises and GIS project. The
topics will be explored and explained by a variety of methods including lectures, guided

discussions, questions and answers and lab exercises. Students are expected to read assignments in advance and to participate actively in the discussions and complete their exercises on-time.
There is no separate lab session.

Measurement, Testing and Assessment

Requirements for Course-Course requirements include regular attendance at class, doing required readings, participating in discussions, completing assigned homework, other mapping and writing projects and a GIS project. There will be a number of quizzes and a mid-term and a final examination.

Class Attendance-The University expects all students to attend classes on a regular basis. If a student finds it necessary to be absent from class because of illness or other personal reasons, the reason for the absence should be reported to the instructor. This is for the instructor.s information and in no way excuses the absence, nor does it relieve the student of the responsibility for assignments covered during the period of absence. Extenuating circumstances, which may force a student to be absent, should be reported to the departmental office and to the instructor. The instructor will determine the amount of assistance a student will need to complete the course requirements.

Attendance and Punctuality-Class attendance will be checked on a regular basis. Class attendance
and active participation in class contribute to each student.s participation grade. If a late arrival, early
departure, or class absence occurs, the student will not be able to receive the full participation grade.

Examinations-Written mid-term and final examinations will assess each student.s ability to
understand and apply GIS concepts and skills. Students. responses to questions will be evaluated
based on comprehension of theoretical concepts.

Make up exams-There will be NO make up exams except with valid medical proof. If an
exam is not taken as scheduled, the student risks losing points. There could be additional
quizzes if further assessment of students. work is needed. If a student misses a pop quiz, it
cannot be made up.

GIS project-A GIS project will enable to explore in-depth, some aspects of the topic of the student's
choice and develop skills in the use of technology to map and analyze water resources problems.
Further details on the project will be given in class.

Lab Assignments-Lab assignments will emphasize GIS application, data acquisition, geoprocessing,
analysis and modeling.

Assignments – On Time -Assignments need to be completed on time; otherwise they will be graded
down. Reports should be typed in 12 fonts on double-spaced pages with 1” margins on each side.

Final Examination Policy -Final examinations are held during the last week of the term; all students
are required to take the examinations according to the examination schedule issued by the Vice
President for Academic Affairs.

Grading Criteria -100% grading scale:

A = 90% and above; B = 80-89%; C = 70-79%; D = 60-69%; F = Below 60%

Graded Assignments:

Class Participation 5%

Written/oral reports:

. Homework 5 %
. Lab Exercises 20%
. GIS project 30%

Examinations:

. Quizzes 5%
. Mid-term exam 15%
. Final examination 20%

Total 100%

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complaint by contacting the EEO/AA Coordinator in the Office of Human Resources in Building 38,
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UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: Environmental Impact Assessment

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Course Description

This course is designed to provide the graduates a critical overview of the theory and practice of
Environmental Impact Assessment (EIA). It explores the need for environmental impact assessments, the
different types of assessments, and the regulatory and technical requirements of preparing an assessment.
Student will learn the principle of environmental impact assessment and environmental impact reports in
class. Then student will be given a group assignment and practice how to conduct environmental impact

assessment, and prepare environmental impact statement. It requires team work, literature study, writing
report, and oral presentation. This course will include a series of lectures and student presentations.

Course rationale

This course is required for environmental science majors to explore the policy, administration, and
science of environmental impact assessment in order to influence decisions affecting the environment. It
also prepares the student to participate in environmental decision making.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire
better scientific understanding of Environmental Impact Assessment.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

. Describe Environmental Impact Assessment process
. Recognize types and steps of the assessment
. Predict Impacts of the Assessment
. Describe the purpose and role of Environmental Impact Assessment in the decision-
making process;

. Assess options for estimating environmental and social impacts; and
. Discuss the format of an EIA Report (Environmental Impact Statement, or Environmental
Statement).
.

Required Text Book:

Environmental Impact Statements, 2nd Edition Jacob Bregman, 1999 CRC Press LLC

.

Suggested supplementary readings:

. Bass, R.E., A.I. Herson and K.M. Bogdan. 2001. The NEPA Book. Solano Press Books, Point
Area, CA.

Course Content:

1. Introduction

2. The Environmental Impact Assessment Process

3. Types of Assessments

4. Basic Steps in the Process

5. Predication and Assessment of Impacts - Physical Environment

6. Predication and Assessment of Impacts - Biological Environment

7. Predication and Assessment of Impacts - Human Resources

8. Predication and Assessment of Impacts - Human Resources

9. Evaluation of Alternatives

10. Public Participation

11. Management of Environmental Impact Assessments

12. Writing an Environmental Impact Assessment

13. Student Presentations

Teaching method

Teaching methods will include but not limited to: lectures, class discussions, computer exercises, library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-point scales:

Literature Review: Student will be required to read three latest research articles relevant to the course content, and three page critique of the articles on the basis of the hypothesis tested, methodology applied, result summarized, and further recommendation. The written assignment will account for 10% of the grade.

Term Project: Students are required to work on the assigned project in team, and prepare a written report of Environmental Impact Statement.

Computer Technology Assignment: Student will be required conduct internet search in group
on the topic provided by the instructor and make a PowerPoint Presentation that accounts for 10%
of the grade. This assignment requires team work.

Attendance and class participation: Student are required to attend and all classes and actively
participate on the class discussion.

Assessment in 100%- point scale:

. Literature Review 10%
. Term project: Writing Environmental Impact Statement 40%
. Computer Technology Assignment 10%
. Class Participation 10%
. Final Exams 30%

Total 100%

.

Grade Criteria: A: 90 and above

B: 80-89

C: 70-79

D: 60-69

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If it is determined that a student has violated the Academic Integrity Policy, the academic dean may suspend the student from the University

UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: Internship

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 3

Description

This service learning course is a supervised work-and-learning experience in water resource management
under the direction of a University faculty member and an employee of a participating firm. Ten to 20
hours a week of student time is expected during the academic year; 20 to 40 hours a week are expected
during a five-week summer term. The internship program needs to involve in data collection, analysis and
interpretation, field or laboratory experience and writing report.

Learning Goals

The principal goal of this course is to reinforce classroom theory and practice by providing students on-the-job training in writing/editing and communication. The course also provides the following benefits for the university and the employer:

- provide feedback that will enable faculty to adapt curriculum content to prepare students for the workplace.
- provide employers with educated and committed interns who can function in and contribute to the sponsoring organization.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

- Evaluate realistically a decision to enter the field of professional water resource management.
- Improve students. writing/editing skills.
- Compete more effectively in the job market.
- Assess the value of their professional communication and/or journalism courses as preparation for jobs in business, industry, government, and/or journalism.

Teaching Method

Students will be involved on the hand-on-training at real working environment including data collection, analysis and interpretation, field or laboratory experience and writing report.

Student responsibility. Interns should spend nearly all of their time engaged in collecting data, data analysis and interpretation, writing and writing-related activities such as editing, design, interviewing, or conducting research. At the start of the internship period, students may be assigned a special project to complete, or they may be assimilated into the routine on-site work of their employer.s department.

Measurement, Testing and Assessment:

Achievement of the learning goals and learning outcomes will be assessed on the basis of the following points and 100%-point scales:

o Employers will complete an Internship Evaluation Form (supplied by the faculty supervisor) two or three times per term. A Student Internship Assessment Form, completed by the student at the end of the term.
o Upon receipt of the Internship Evaluation Form, the faculty supervisor may contact the employer to discuss the periodic evaluation of the intern. Interns and faculty supervisors will meet after each of these evaluations to discuss the intern.s progress.
o The final grade for the course will be assigned on the basis of the information and material supplied by the student, plus the employer.s and faculty supervisor.s assessments of the student.s performance.

Assessment in 100%- point scale:

Employer assessment 20%

Technical Report 20%

Oral presentation 10%

Student Assessment by Faculty Supervisor 50%

Total 100%

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UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Sustainability and Environmental Science

Department of Environmental Science

Professional Science Master (PSM) Degree Program in

Water Resource Management

Course Syllabus

Course Title: Ethics, Responsible Conduct for STEM professionals

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit: 1

Course Description

This course is designed to explore ethical rules and constraints to provide the student with an
understanding of the standards of professional responsibility that are expected. Through a case-based
approach students will consider various ethical issues within the often competing demands imposed by
the operation of the “rule of law” and concerns for public safety & security.

Course rationale

Ethics and professionalism conduct are vital for Science, Technology, Engineering and Mathematics (STEM) professionals. This course is required for students who are enrolled in the graduate program of STEM.

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire better scientific understanding of Ethics and professional conducts and responsibility.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

1. Develop and refine skills needed to solve problems involving relevant topic areas of responsible scientific conduct;
2. Clearly articulate -- both verbally and in writing -- ethically and legally acceptable solutions to problems posed about scientific conduct;
3. Develop a positive attitude towards life long learning in the matters of scientific integrity and responsible research conduct;
4. Understand the relevant written guidelines bearing on the conduct of scientific research, including those dealing with scientific authorship, use of humans and animals in research,

academic honor standards, conflict of interest, collaborative research, and general standards
of scientific conduct; and
5. Describe the conventions of scientific record keeping and have a clear understanding of data
ownership issues.

Required text book

. Scientific Integrity: Text and Cases in Responsible Conduct of Research by Francis L. Macrina,
2005.

Suggested supplementary readings

. Integrity in scientific research: creating an environment that promotes responsible conduct. By
Institute of Medicine (U.S.). Committee on Assessing Integrity in Research Environments,
National Research Council (U.S.), United States. Office of the Assistant Secretary for Health.
Office of Research Integrity - The National Academies Press (2002) ISBN 0309084792
. Responsible science: ensuring the integrity of the research process. By Committee on Science,
Engineering, and Public Policy (U.S.). Panel on Scientific Responsibility and the Conduct of
Research, Institute of Medicine - National Academy Press (1992) ISBN 0309047315
. Code of Ethics for Scientist-
http://user.it.uu.se/~pugwash/Etik/uppsalakodex

Course Outline:

1. Methods, manners, and the responsible conduct of research 1
2. Ethics and the scientist
3. Mentoring
4. Authorship and peer review
5. Use of humans in biomedical experimentation

6. Use of animals in biomedical experimentation
7. Managing competing interests
8. Collaborative research
9. Ownership of data and intellectual property
10. Genetic technology and scientific integrity
11. Scientific record keeping

Teaching Methods:

Teaching methods will include but not limited to: lectures, class discussions, computer exercises, library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-point scales:

Attendance and Class Room Assignments: Students are required to attend all lectures and computer exercise and participate on the class discussion which accounts for 10% of over all grades. Students are required to complete their class room assignment which might be considered in their final grade.

Written Assignments: Student will be required to read three latest research articles relevant to
the course content, and three page critique of the articles on the basis of the hypothesis tested,
methodology applied, result summarized, and further recommendation. The written assignment
will account for 20% of the grade.

Computer Technology Assignments: Student will be required conduct internet search in group
on the topic provided by the instructor and make a PowerPoint Presentation that accounts for 5%
of the grade. This assignment requires team work.

Assessment in 100% - point:

Attendance and class participation 10%

Written Assignments 20%

Computer Technology Assignments 20%

Mid Term Examination 20%

Final Exam 30%

Total 100%

Grading Criteria: A: 90 and above

B: 80-89

C: 70-79

D: 60-69

F: 59 and below

Attendance Policy

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or as soon after the absence as possible. Missed exams are made up at the discretion of the instructor. Late

student work is accepted only when approved prior to the due date. Schedule of exams and quizzes are on
the schedule for the course (distributed separately).

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education and employment, and will not discriminate against any person in recruitment, examination,
training, promotion, retention, disciple or any other aspect of employment and education administration
because of race, age, color , sex, physical or mental disability, martial status, religion national origin,
political affiliation, personal appearance, sexual orientation, matriculation, source of income, place of
residence, familial status, or family responsibilities, in accordance with he provisions of the D.C. Human

Rights Act of 1977 (D.C. Law 2-38). Vietnam War Veterans and disabled veterans are also covered under this policy.

Filing a Complaint

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The Americas with Disabilities Act (ADA)

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The Family Education Rights and Privacy Act (FERPA)

The Family Education Rights and Privacy Act of 1974, as amended, known as FERPA, is a federal law that protects the privacy of student education records that are directly related to the student and are maintained by the University.

Under FERPA, students are given certain rights regarding education records:

. The right to inspect and review education records kept by the University.
. The right to request the amendment of education records the student believes to be inaccurate,

misleading or otherwise in violation of his or her privacy rights.
. The right to consent to disclose directory information, except to the extent that FERPA and the
regulations authorize disclosure without consent.

. The right to file with the U.S. Department of education a complaint concerning alleged failures
by the institution to comply with the requirements and regulations of FERPA. The complaint
should be in writing and contain specific allegations of fact. The complaint should be sent to:

Family Policy Compliance Office

U.S. Department of Education

400 Independence Avenue, SW

Washington, D.C. 20202-4605

Academic Integrity Policy

Students enrolling at the University of the District of Columbia assume the obligation to maintain
standards of academic integrity. Violation of academic obligations include: unethical practices and acts
of academic dishonesty, such as cheating, plagiarism, falsification and the facilitation of such acts.

Cheating includes the actual giving or receiving of any unauthorized aid or assistance or the actual giving
or receiving of any unfair advantage on any form of academic work. Plagiarism is the use of another.s
ideas or words, or both, as if they were one.s own. However, ideas or direct quotations from others are
acceptable with appropriate citation of source.

Students are subject to dismissal from a degree program for unethical practices and acts of academic dishonesty. It should also be noted that a plea of ignorance of the policy will not be accepted. The prescribed policies and procedures that pertain to violation of the academic integrity policy are contained in the Student Handbook.

UNIVERSITY OF THE DISTRICT OF COLUMBIA

College of Urban Agriculture, Architecture and Environmental Science

Department of Environmental Science

Professional Science Master Program in Water Resource Management

Course Syllabus

Course Title: Stream Restoration

Course Number:

Semester:

Instructor:

e-mail:

Phone Number:

Office Hours:

Credit Hours: 3

Course Description

This course is designed to provide a technical understanding of the theoretical and practical principle of
stream restoration used to return an impaired or degraded river corridor ecosystem to a close
approximation of its remaining natural potential. The course explores the scientific basis of stream
restoration programs through interdisciplinary theories and practice, and presents principles of hydrology,
sedimentation engineering, geomorphology, and ecology relevant to the design and evaluation of stream

restoration projects. Students will be exposed to a variety of stream restoration concepts through lectures,
seminars, field trips, and independent project assessment.

Course Rationale

Restoration is a tool for meeting some Clean Water Act, and this course is required for graduates who are
majoring Water Resource Management.

Pre-requisite

Hydrology and Water Quality Assessment, Monitoring and Treatment

Learning Goals

The learning goal of the course includes proficiency in oral and written communication skills; and acquire
better scientific understanding of stream restoration.

Learning Outcomes

Upon successful completion of this course, students will have the knowledge and skills to:

o Determine goals of stream restoration;
o Design solution for stream corridor;

o Assess stream hydrology and hydraulics;
o Conduct sediment impact assessment;
o Develop alluvial channel design; and
o Develop and implement stream restoration project

.

Required text book

Harrelson, Cheryl C., C.L. Rawlins and John P. Potyondy. 1994. Stream channel reference sites: an
illustrated guide to field technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department
of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 61 p.
Available for download at http://www.fs.fed.us/rm/pubs_rm/rm_gtr245.pdf

Doll, B.A., G.L. Grabow, K.R. Hall, J. Halley, W.A. Harman, G.D. Jennings, and D.E. Wise,
Stream Restoration: A Natural Channel Design Handbook, North Carolina Stream
Restoration Institute and North Carolina State University, 128 pp., 2003.

http://www.bae.ncsu.edu/programs/extension/wqg/sri/stream_rest_guidebook/guidebook.html

Supplemental reading

Stream Restoration Design Handbook (NEH-654) and. By Jcohen, Created May 19 2009, Author/Source:
United States Department of Agriculture Natural Resources Conservation Service.

Bridge, J.S., Rivers and Floodplains: Forms, Processes, and Sedimentary Record, Blackwell Publishing,
Oxford, 491 pp., 2003.

Knighton, D., Fluvial Forms and Processes: A New Perspective, Arnold, London, 383 pp., 1998. River
Ecology and Habitat Allan, J.D., and M.M. Castillo, Stream Ecology: Structure and Function of
Running Waters, 2nd ed., Springer, The Netherlands, 436 pp., 2008. Dorava,

J.M., D.R. Montgomery, B.B. Palcsak, and F.A. Fitzpatrick, eds., Geomorphic Processes and Riverine
Habitat, Water Science and Application, Volume 4, 250 pp., 2001. The Need for River Restoration

Brierley, G., and K. Fryirs, eds., River Futures: An Integrative Scientific Approach to River Repair, Island
Press, 328 pp., 2008. Restoration Ecology, Special Section: Restoring Rivers: A Synthesis of
Findings From Project Records and Interviews, vol. 15(3), pp. 472-591, 2007.

Thorp, J., M. Thoms, and M. Delong, The Riverine Ecosystem Synthesis: Toward Conceptual
Cohesiveness in River Science, Academic Press, Oxford, 232 pp., 2008.

Brookes, A., and F.D. Shields, Jr., eds., River Channel Restoration: Guiding Principles for Sustainable
Projects, John Wiley and Sons, Chichester, 23-74, 1996.

United States Department of Agriculture-Natural Resources Conservation Service, Stream Restoration
Design, Part 654 National Engineering Handbook, 2007.

United States Environmental Protection Agency, Ecological Restoration: A Tool To Manage Stream
Quality, EPA 841-F-95-007,
http://www.epa.gov/owowwtr1/NPS/Ecology/exsum.html and
http://www.epa.gov/owow/nps/Ecology/, 1995.

Watson, C.C., D.S. Biedenharn, and C.R. Thorne, Stream Rehabilitation Version 1.0, Cottonwood
Research LLC, Fort Collins, Colorado, 201 pp., 2005.

Resources:

Students are encouraged to purchase those books of close interest to their studies. All graphics
and PowerPoint presentations shown in class, as well as pertinent papers, reports, and manuals,
will be posted on the blackboard in PDF format prior to lectures and seminars.

Required Equipment:

A “write in the rain” type of field notebook is required. Your instructors will supply most field equipment. We will spend much of the time along rivers and wetlands, so dress appropriately for outdoor work, including sturdy boots, long pants, sunscreen, rain gear, warm clothing (if needed) and snacks and water. Some of the labs will require wading shallow streams, so bring old tennis shoes or hip boots.
Specific gear requirements and safety will be discussed before each lab.

Course Outline:

1. Introduction to stream restoration
2. Environmental Regulation
3. Stream Assessment and Survey Procedures
4. Stream Classification Systems
5. Hydrology and hydraulics assessment
6. Restoring Incised Streams
7. Reference Reach Survey
8. Stream Restoration Design Procedures
9. Vegetation Stabilization and Riparian-Buffer Re-establishment
10. Erosion and Sediment-Control Plan
11. Preparing Restoration Project
12. Project Implementation
13. Restoration Evaluation and Monitoring

Teaching Methods:

Teaching methods will include but not limited to: lectures, discussions, field and laboratory exercises, library and internet research, PowerPoint presentations, textbook reading assignments and examinations.

Measurement, Testing and Assessment

Achievement of the learning outcomes will be assessed on the basis of the following points and 100%-

point scales:

Attendance Statement: Students are required to attend all lectures and filed exercises which
accounts for 10% of over all grade.

Written Assignments: Student will be required to read three latest research articles relevant to
the course content, and three page critique of the articles on the basis of the hypothesis tested,
methodology applied, result summarized, and further recommendation.

Computer Technology Assignments: Student will be required conduct internet search in groups
on the topic provided by the instructor and prepare a PowerPoint Presentation to the class. This
assignment requires team work, and it accounts for 15% of the overall grade.

Field Exercise: Student will be required to participate on the filed exercises that take at least 2-3
hours per exercise, and submit a complete report for each exercise. There will be three major filed
exercises where student will visit the nearby streams and conduct site assessment and make a
recommendation for the restoration plan. This exercise requires team work that will account for
20% of the grade.

Assessment in 100% - point:

- Participation 10%
- Field exercises 20%
- Written assignment 15%
- Computer technology 15%
- Final Exam 40%

Sub Total 100%

Grading Criteria: A: 90 and above

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