VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

Department of Teaching & Learning
Parent/Student Course Information

Naval Architecture and Ocean Engineering
(AT 8532)
Three Credits, One Year
Grades 10 - 12

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION
Naval Architecture & Ocean Engineering will introduce students to the Naval/ Commercial Marine Engineering and Design Industry, and begin to prepare them for future career opportunities in this exciting field. Topics of instruction will include the differences between naval and commercial ship drafting and design formats and standards, types of drawings and an introduction to the primary design disciplines of the Marine Industry.

CERTIFICATION
Autodesk AutoCAD Certification

STUDENT ORGANIZATION
SkillsUSA is a co-curricular organization for all students enrolled in trade and industrial education programs. SkillsUSA is a partnership of students, teachers and industry working together to ensure America has a skilled workforce. SkillsUSA helps students excel by providing educational programs, events and competitions that support career and technical education (CTE) in the nation’s classrooms. Students are highly encouraged to participate.

PREREQUISITE
None

OPTIONS FOR NEXT COURSE
Architectural Design

REQUIRED STUDENT TEXTBOOK
None

COMPETENCIES FOR NAVAL ARCHITECTURE AND OCEAN ENGINEERING

Demonstrating Personal Qualities and Abilities

1 Demonstrate creativity and innovation.
2 Demonstrate critical thinking and problem solving.
3 Demonstrate initiative and self-direction.
4 Demonstrate integrity.
5 Demonstrate work ethic.

Demonstrating Interpersonal Skills

6 Demonstrate conflict-resolution skills.
7 Demonstrate listening and speaking skills.
8 Demonstrate respect for diversity.
9 Demonstrate customer service skills.
10 Collaborate with team members.

Demonstrating Professional Competencies

11 Demonstrate big-picture thinking.
12 Demonstrate career- and life-management skills.
13 Demonstrate continuous learning and adaptability.
14 Manage time and resources.
15 Demonstrate information-literacy skills.
16 Demonstrate an understanding of information security.
17 Maintain working knowledge of current information-technology (IT) systems.
18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation.
19 Apply mathematical skills to job-specific tasks.
20 Demonstrate professionalism.
21 Demonstrate reading and writing skills.
22 Demonstrate workplace safety.

Examining All Aspects of an Industry

23 Examine aspects of planning within an industry/organization.
24 Examine aspects of management within an industry/organization.
25 Examine aspects of financial responsibility within an industry/organization.
26 Examine technical and production skills required of workers within an industry/organization.
27 Examine principles of technology that underlie an industry/organization.
28 Examine labor issues related to an industry/organization.
29 Examine community issues related to an industry/organization.
30 Examine health, safety, and environmental issues related to an industry/organization.

Addressing Elements of Student Life

31 Identify the purposes and goals of the student organization.
32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.
34 Identify Internet safety issues and procedures for complying with acceptable use standards.

Exploring Work-Based Learning

35 Identify the types of work-based learning (WBL) opportunities.

36 Reflect on lessons learned during the WBL experience.
37 Explore career opportunities related to the WBL experience.
38 Participate in a WBL experience, when appropriate.

Practicing Safety

39 Follow general safety procedures.
40 Adjust equipment for maximum comfort and usability.
41 Describe ergonomic considerations.

Performing Architectural Drafting and Design Operations with Extensive Use of Computer-Aided Design and Drafting (CADD)

42 Describe key developments in the history of architecture.
43 Use reference materials.
44 Identify reasons for building codes.
45 Apply architectural symbols to a drawing.
46 Identify items which comprise a set of working drawings.
47 Design a site plan.
48 Prepare a site plan.
49 Design a floor plan.
50 Prepare a floorplan.
51 Design a foundation/basement plan.
52 Prepare a foundation/basement plan.
53 Design a wall section.
54 Prepare a wall section.
55 Design a roof plan.
56 Prepare a roof plan.
57 Design an electrical plan.
58 Prepare an electrical plan.
59 Design a plumbing plan.
60 Prepare a plumbing plan.
61 Select doors and windows to match the style of the house.
62 Prepare a door and window schedule.
63 Design interior elevations.
64 Prepare interior elevations.
65 Design a set of stairs.
66 Prepare a detailed drawing of a set of stairs.
67 Design a fireplace.
68 Prepare a detailed drawing of a fireplace.
69 Design exterior elevations.
70 Prepare exterior elevations.
71 Estimate material quantities.
72 Prepare a rendered presentation drawing.
73 Design a HVAC plan.
74 Prepare an HVAC plan.
75 Create a physical or 3-D CADD presentation model.
76 Prepare a title sheet.

Preparing a Career Portfolio

77 Complete a professional drafting portfolio.
78 Gather material for a portfolio.

79 Organize a portfolio.
80 Present a portfolio.

Local Competencies

Introduction to Naval Architecture and Ocean Engineering

81 Demonstrate proficiency in AutoCAD.
82 Demonstrate ability to develop orthographic projection views, dimensioning, and tolerance.
83 Demonstrate proficiency in using view ports and drawing views to scale.
84 Describe the basic engineering fundamentals of Marine Engineering and Design.
85 Identify the different disciplines of Marine Engineering and Design.
86 Understand the responsibility of each of the different disciplines of Marine Engineering and Design.
87 Understand the terminology used for ship design.
88 Identify and understand the use of abbreviations used by the ship design industry.
89 Demonstrate an understanding of ship layout and compartment design standards.
90 Identify the similarities and differences between naval and commercial ship design.
91 Describe the basic similarities/differences between naval and commercial ship design.
92 Identify examples of naval and commercial ship design.
93 Research and identify standards and specifications used in the naval and commercial ship design industry.
94 Understand the use of naval and commercial standards and specifications.
95 Explain the overlap of standards and specifications between naval and commercial design.
96 Identify the different types of drawings used for naval and commercial ship design industry.
97 Understand the use of the Ship Work Breakdown Structure (SWBS) with respect to Ship Drawing Development.
98 Describe potential resources for obtaining the different types of naval and commercial ship drawings.
99 Describe the review process for naval and commercial ship drawing packages.
100 Describe the approval process for naval ship drawing packages.
101 Describe the approval process for commercial ship drawing packages.
102 Discuss the use of Naval Sea Systems Command (NAVSEA) Technical Specification 9090-600.
103 Identify the different types of ship alterations (SHIPALT) drawings with respect to the SWBS.
104 Describe the use of the different types of SHIPALT drawings.
105 Project – Develop Naval SHIPALT Drawing Format Sheets.

Introduction to Electrical, Electronics and Interior Communications (IC) Engineering and Design

106 Describe the basic engineering fundamentals electric plant system.
107 Describe the engineering fundamentals of power distribution.
108 List the different types of power system mod drawings with respect to the SWBS.
109 Identify the various lighting systems.
110 Describe the function of lighting system modifications.
111 List the different types of lighting system modification drawings with respect to the SWBS.
112 Discuss the general engineering requirements for electronic systems.
113 Describe the function and electronic system block wiring diagram.
114 List the different types of electronic system block wiring diagrams with respect to the SWBS.
115 Describe the function of an electronic system cable run sheets.
116 Describe the differences between cable run sheets and elementary wiring diagrams.
117 Demonstrate the use of Cable base software to develop an electronic system cable run sheet.
118 Describe the function of an electronic system arrangement drawing.
119 Describe the relationship between the electronic system block wiring diagram and the arrangement drawing.
120 Describe he relationship between the electronic arrangement drawing and the hull foundation drawings.
121 Discuss the general engineering requirements for Interior Communications Systems.

122 Describe the function of IC system elementary wiring diagram.
123 List the different types of IC system drawings with respect to the SWBS.
124 Project – Develop a Power, Lighting, Block Wiring Diagram, Interior Communications System and Arrangement Drawing.

Introduction to Machinery, Piping and HVAC Engineering and Design

125 Describe the basic engineering fundamentals of machinery plants.
126 Describe the various types of machinery plant control systems.
127 List the types of drawings used to illustrate machinery arrangement and control systems.
128 Describe the basic engineering fundamentals of propulsion systems.
129 Describe the various types of propulsion systems.
130 List the types of drawings used to illustrate propulsion systems.
131 Project – Develop a Machinery Arrangement and Propulsion Control System Drawing.
132 Describe the basic engineering fundamentals of piping systems.
133 Describe the components and symbology used in piping systems drawings.
134 List the types of drawings used to illustrate piping diagrams with respect to the SWBS.
135 Describe the various types of water handling and drainage systems with respect to the SWBS.
136 Describe the various types of fuel handling systems with respect to the SWBS.
137 Describe the various types of steam handling systems with respect to the SWBS.
138 Describe the basic engineering fundamentals of heating systems.
139 Describe the components and symbology used in heating system drawings.
140 List the different types of drawings used to show heating systems with respect to the SWBS.
141 Describe the components and symbology used in cooling system drawings.
142 List the different types of drawings used to show cooling systems with respect to the SWBS.
143 Project – Develop Machinery, Piping and HVAC Drawings.

Introduction to Hull, Outfitting, and Habitability Engineering and Design

144 Describe the basic engineering fundamentals of hull structure.
145 Describe the function of hull structure and foundations.
146 List the different types of drawings used to show hull structure and foundations with respect to the SWBS.
147 Describe the function and use of various structural materials (aluminum, steel, FRP).
148 Demonstrate and understanding of mounting and fastening methods.
149 Identify Outfitting items such as ladders, handrails and safety equipment.
150 Demonstrate an understanding of equipment and workspace arrangements.
151 List the different types of crew living spaces and their arrangement with respect to the SWBS.
152 Describe the function of galleys, sculleries, and mess decks.
153 Describe the function of laundry, medical and other human services spaces.
154 Demonstrate an understanding of habitability requirements.
155 Project – Develop a Hull Structure, Outfitting and Habitability Drawings.

Aaron C. Spence, Ed.D., Superintendent
Virginia Beach City Public Schools
2512 George Mason Drive, Virginia Beach, VA 23456-0038

Produced by the Department of Teaching and Learning.
For further information, please call (757) 263-1070.

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs, activities, employment, or enrollment, and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 5-7, 5-19, 5-20, 5-44, 6-33, 6-7, 7-48, 7-49, 7-57 and Regulations 4-4.1, 4-4.2, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, enrollment, counseling services, physical education and athletic, vocational education, instructional materials, extracurricular activities and employment.

Title IX Notice: Complaints or concerns regarding discrimination on the basis of sex or sexual harassment should be addressed to the Title IX Coordinator, at the VBCPS Office of Student Leadership, 641 Carriage Hill Road, Suite 200, Virginia Beach, 23452, (757) 263-2020, Mary.Dees@vbschools.com (student complaints) or the VBCPS Department of School Leadership, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (757) 263-1088, Elizabeth.Bryant@vbschools.com (employee complaints). Additional information regarding Virginia Beach City Public Schools' policies regarding discrimination on the basis of sex and sexual harassment, as well as the procedures for filing a formal complaint and related grievance processes, can be found in School Board Policy 5-44 and School Board Regulations 5-44.1 (students), School Board Policy 4-4 and School Board Regulation 4-4.3 (employees), and on the School Division's website at Diversity, Equity and Inclusion/Title IX. Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Plaza Annex/Family and Community Engagement Center, 641 Carriage Hill Road, Suite 200, Virginia Beach, VA 23452.

The School Division is committed to providing educational environments that are free of discrimination, harassment, and bullying. Students, staff, parents/guardians who have concerns about discrimination, harassment, or bullying should contact the school administration at their school. Promptly reporting concerns will allow the school to take appropriate actions to investigate and resolve issues. School Board Policy 5-7 addresses non-discrimination and anti-harassment, Policy 5-44 addresses sexual harassment and discrimination based on sex or gender. Policy 5-36 and its supporting regulations address other forms of harassment.

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