

Administrative Master Syllabus

Course Information

Course Title	Math & Chemistry Fundamentals for Nuclear Power
Course Prefix, Num. and Title	NUCP 1371 Math & Chemistry Fundamentals for Nuclear Power
Division	Vocational Science
Department	Nuclear Power Technology
Course Type	WECM Course
Course Catalog Description	This course teaches algebra, geometry, and trigonometry used at nuclear power plants. It also teaches water chemistry control basics and reactor water chemistry fundamentals including radiochemistry.
Pre-Requisites	TSI ELAR (Reading and Writing) and Math requirements met
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours:	3:3:0
Lab/Other Hours	
Equated Pay Hours	3
Lab/Other Hours Breakdown: Lab Hours	Enter Lab Hours Here.
Lab/Other Hours Breakdown: Clinical Hours	Enter Clinical Hours Here.
Lab/Other Hours Breakdown: Practicum Hours	Enter Practicum Hours Here.
Other Hours Breakdown	List Total Lab/Other Hours Here.

Approval Signatures

Title	Signature	Date
Department Head:		
Division Chair:		
VPI:		

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

Math - 30hrs

(This includes addition, subtraction, multiplication, division, unit analysis, metric conversions, ratios, percentages, decimals, fractions, significant figures, exponents & logarithmic expressions, powers of ten, scientific notation, square roots, cube roots & fractional exponents, basic algebra, trigonometry, calculating volumes & areas, plotting graphs using logarithmic coordinates & reading different types of charts.)

Chemistry - 10hrs

(This includes characteristics & methods of prevention of various types of corrosion, water treatment, secondary water & primary water impurities, all volatile treatment, chemicals used in the reactor coolant, radiolysis & recombination of water and radiochemistry analysis in determining fuel defects.

Reviews / Exams - 8hrs

Lab - None, except as required for lecture demonstration

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

MATH:

1. CONVERT quantities to/from any of the following: fraction, ratio, decimal, percentage.
2. IDENTIFY the significant figures for given decimal values.
3. SOLVE exponential and logarithmic expressions for the indicated unknown.
4. SOLVE equations expressed in powers of ten, prefixes, and scientific notation.
5. SOLVE algebraic expressions involving repeating or multiple variables.
6. SOLVE algebraic expressions involving repeating or multiple variables.
7. SOLVE trigonometric problems for the length of the hypotenuse, adjacent side, opposite side, or angle, if given any of the two.
8. CALCULATE the value for any variable using the formulas for finding: area of a square, a rectangle, a circle, volume of a rectangular box, cube and cylinder.
9. PLOT graphs of plant data using rectangular and logarithmic coordinate systems.

CHEMISTRY:

1. List three benefits of proper chemistry control.
2. Define chemical terms.
3. Describe pH and conductivity.

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4. Explain the characteristics and methods of prevention of several types of corrosion.
5. Describe methods of water treatment.
6. Discuss All Volatile Treatment (AVT) of the Secondary System.
7. State the source of Primary System impurities and their effects on the Primary System.
8. Summarize the use of chemicals in the Reactor Coolant System.
9. Describe radiolysis and recombination of water.
10. Discuss radiochemistry analyses used in determining the presence of fuel element defects.

Methods of Assessment:

Periodic written quizzes and exams.

Exam analysis will be performed to identify weaknesses in the program.

Required text(s), optional text(s) and/or materials to be supplied by the student:

Handouts for each lesson plan. A scientific calculator will be required for this course.

Suggested Course Maximum:

35

List any specific or physical requirements beyond a typical classroom required to teach the course.

None, except lab use as needed for lecture demonstration.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

1. Quizzes, homework assignments, and class participation - 25%
2. Cross Disciplinary Skills (work ethic, safety, teamwork, housekeeping, attitude) - 25%
2. Mid-term Exam - 25%
3. Final Exam - 25%

90 to 100: A

80 to 89: B

70 to 79: C

60 to 69: D

0 to 59: F

Note: For the additional NUCP certificate, the student must complete the course with a minimum of 80%.

Curriculum Checklist:

☐ **Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐ **Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms

☐ Critical Thinking

☐ Communication

☐ Empirical & Quantitative Skills

☐ Teamwork

☐ Social Responsibility

☐ Personal Responsibility

☒ **WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist