Program Report for the Preparation of Chemistry Teachers

Education Standards and Practices Board

C O V E R S H E E T

Institution: University of North Dakota State: ND

Date Submittted

Name of Preparer: Julie Abrahamson, Assistant Professor, Chemistry & Lars Helgeson, Professor, Teaching and Learning.

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Program documented in this report:

Name of Institution's program: Chemistry Teacher Education
Grade levels for which candidates are being prepared 9-12
Degree or award level: B.S. in Chemistry

Is this program offered at more than one site? ☐ **Yes** **x** **No**

If yes, list sites at which the program is offered:

Title of the state license for which candidates are prepared
Chemistry

Program report status:

- **x Initial review**
- ☐ **Rejoinder**
- ☐ **Response to national recognition with conditions**

State licensure requirement for national recognition:

ESPB requires 80% of the program completers who have taken the test to pass the applicable state licensure test for the content field, if the state has a testing requirement. Does your institution require such a test? Test information and data must be reported in Section II

x **Yes** ☐ **No**

REPORT

I. Contextual Information – Provides the opportunity for institutions to present general information to help reviewers understand the program.

Candidate Information

Directions: Provide three years of data on candidates enrolled in the program and completing the program, beginning wit the most recent academic year for which numbers have been tabulated. Please report the data separately for the levels/tracks (e.g., baccalaureate, post-baccalaureate, alternate routes, master's, doctorate) being addressed in this report.

Program: Chemistry		
Academic Year	**# of Candidates Enrolled in the Program**	**# of Program Completers**
Sum04-Spr05	4	1
Sum05-Spr06	5	0
Sum06-Spr07	3	1

I. Contextual Information & Program Response To ESPB Standards

Program: Chemistry

Descriptive Information About the Program

Teacher education candidates choose one of two possible tracks in the Chemistry Program:
(A) B.S. with Major in Chemistry (Physical Science Emphasis)
(B) B.S. with Major in Chemistry (Biochemistry Emphasis)
[See Curriculum Exhibit Form Basic Program, p. 20]
The required aspects of chemistry are studied in the following courses:
Organic:
Chem 341 and Chem 341L (Organic Chemistry I and lab)
Chem 342 and Chem 342L (Organic Chemistry II and lab)
Inorganic:
Chem 221 and Chem 221L (Fundamentals of Chemistry – Concepts and lab)
Chem 222 and Chem 222L (Fundamentals of Chemistry – Analysis and lab)
Analytical:
Chem 333 (Introductory Environmental, Clinical, and Forensic Chemical Analysis)
Chem 461 (Instrumental Analysis) *[option A]*
both have two credit laboratory components
Physical:
Chem 464 and Chem 465 (Physical Chemistry I and II) *[option A]*
Chem 462 (Physical Chemistry lab) *[option A]*
or Chem 466 (Survey of Physical Chemistry) *[option B]*
and Chem 467 (Survey of Physical Chemistry lab) *[option B]*
Biochemistry:
BMB 301 (Biochemistry Lecture)

Response to Standards

13020.1 CHEMISTRY
The chemistry program requires study of organic, inorganic, analytical, physical chemistry, and biochemistry. This study includes:

1 Systematic and quantitative fundamentals of chemistry
These are addressed in the sequence of core courses outlined above. Systematic fundamentals are addressed primarily in the General Chemistry sequence (Chem 221/221L & 222/22L), the Organic Chemistry sequence (Chem 341/341L & 342/342L), and in Biochemistry Lecture (BMB 301). Quantitative fundamentals are addressed in the General Chemistry sequence (Chem 221/221L & 222/222L), in Analytical Chemistry (Chem 333), in the Physical Chemistry Laboratory (Chem 462 or 467) and in Instrumental Analysis (Chem 461).

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Course addressing standard

Number	Title	Description
Chem 221L	Fundamentals of Chemistry – Concepts Laboratory	Atomic & molecular structure, stoichiometry, states of matter, thermodynamics, periodicity and descriptive inorganic chemistry
Activities encountered to meet the standard:		Labs, exams
Assessments	**How assessment measures meeting of standards**	
Ch221L exp 7	Qualitative analysis of metal ions	
pdf of course syllabus attached	Ch221L syll F07.pdf	

Course addressing standard

Number	Title	Description
Chem 222	Fundamentals of Chemistry – Analysis	Properties of solutions, physical and chemical equilibria, chemical kinetics, applications to traditional methods of chemical analysis
Activities encountered to meet the standard:		Lectures, exams
Assessments	**How assessment measures meeting of standards**	
Ch222FinalSp07	Calculations of pH, freezing points, osmotic pressure, activation energy	
pdf of course syllabus attached	Chem 222 syllabus-sp07.pdf	

Course addressing standard

Number	Title	Description
Chem 341	Organic Chemistry I	Structure and bonding, nomenclature, stereochemistry, functional groups, spectroscopy (NMR, IR, MS) for structure determination.
Activities encountered to meet the standard:		Lectures, exams, quizzes
Assessments	**How assessment measures meeting of standards**	
Chem 341 midterm 2 F07	Problems with resonance structures, acidity, organic nomenclature, predicting reactions	
pdf of course syllabus attached	CHEM341_syllabusF07.pdf	

Assessments

a. Chemistry Praxis II Exam

Results

a. Praxis II results for Chemistry

CHEMISTRY 9-12 (0245) PRAXIS II RESULTS

Time Period	ND State Cut Score	Number of Test Takers	Number Passing	Percentage Passing	Average Score	High Score	Low Score
September 2006 – August 2007	147	2	2	100%	168.5	178	159

b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 221L exp 7 F07	45	44	97.8	19.8/25	24/25	14
Chem 222 final sp07	24	24	100%	123.1/150	150	100
Chem 341Exam 2, F07	160	142	88%	81/100	99.75	40.5

Student Work Samples

1	*Ch221L exp 7.1.pdf*	*poorer student's work*
	Ch221L exp 7.2.pdf	*good student's work*
2	*Ch222FinalSp07.good.pdf.pwp*	
	Ch222FinalSp07.poor.pdf.pwp	
3	*Ch 341 E2 F07a.pdf*	*good student's work*
	Ch 341 E2 F07b.pdf	*poorer student's work*

2 Interaction of chemistry and technology and the associated ethical, environmental and human implications;

The application of technology to chemistry is an explicit part of all laboratory courses, and a particular emphasis in the Analytical and Physical Laboratory courses.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Course addressing standard

Number	Title	Description
Chem 221L	Fundamentals of Chemistry – Concepts Laboratory	Atomic & molecular structure, stoichiometry, states of matter, thermodynamics, periodicity and descriptive inorganic chemistry
Activities encountered to meet the standard:		Lectures, labs, exams
Assessments	**How assessment measures meeting of standards**	
Ch221L exp 7	Proper disposal of toxic metal ions required	
pdf of course syllabus attached	Ch221L syll F07.pdf	

Course addressing standard

Number	Title	Description
Chem 342&L	Organic Chemistry II & Lab	Structure and reactivity, name reactions, carbon-carbon bond forming reactions, aromatic and heterocyclic chemistry, biomolecules and polymers, multi-step synthesis.
Activities encountered to meet the standard:		Lectures, labs, exams
Assessments	**How assessment measures meeting of standards**	
Chem 342 Quiz 1 Sp07	Use of IR and UV spectra	
Chem 342 Exam 4 Sp07	Use of IR and NMR spectra	
pdf of course syllabi attached	(1) 342L-07-sylabus; (2) Syllabus,Chem342-07	

Assessments

a. Chemistry Praxis II Exam
b. At least one other measure of knowledge is required.
See 2 tables above

Results

a. Praxis II results for Chemistry: *see above*
b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 221L exp 7 F07	45	44	97.8	19.8/25	24/25	14
Chem 342, quiz 1 sp07	118	54	45.8	4.5/10	9.5	0.5
Chem 342, exam 4, sp07	71	56	78.9	69.3%	100	10.5

Student Work Samples

1	*Ch221L exp 7.1.pdf*	*poorer student's work*
	Ch221L exp 7.2.pdf	*good student's work*
2	*Ch342 Quiz 1B.pdf.pwp*	*better student's work*
	Ch342 Quiz 1F.pdf.pwp	*poorer student's work*
3	*Ch342 Ex4A.pdf.pwp*	*better student's work*
	Ch342 Ex4D.pdf.pwp	*poor student's work*

3 Physics, biology, and earth science (minimum of 16 semester hours with at least four semester hours in each discipline);

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Eight (8) semester hours of Physics is a requirement in all undergraduate chemistry curricula at UND.

Physics 251&L, 252 &L	University Physics I & II	*[option A]*	8
Physics 211&L, 212&L	College Physics I & II	*[option B]*	8

Candidates seeking chemistry teaching certification must also complete eight (8) semester hours of Biology courses:

Biol 150, 151	General Biology I & II	6
Biol 150L, 151L	General Biology I & II Lab	2

Students Candidates seeking chemistry teaching certification must include 4 credits of Earth Science chosen from:

Phys 110/110L	Introductory Astronomy & Lab	4
Geol 101, 101L	Introduction to Geology and Lab	4
Geol 102, 102L	The Earth Through Time and Lab	4
Geog 121/121L	Global Physical Environment & Lab	4
Geog 134/134L	Introduction to Global Climate & Lab	4

[*See Physics, Geology, and Geography department reports for more syllabi and assessment information.]*

Course addressing standard

Number	**Title**	**Description**
Phys 211. 211L Phys 212, 212L	College Physics I & II (8 semester hours)	The non-calculus general physics course sequence recommended for pre-medical or pre-professional students. Topics: Newtonian mechanics and gravitation, work and energy, solids and fluids, heat and thermodynamics, vibrations and waves, electricity and magnetism, light and optics, and an introduction to modern physics. The laboratory is a co-requisite of each course.
Activities encountered to meet the standard:		Lectures, labs, exams
pdf of course syllabus attached	*see Physics department report*	

Course addressing standard

Number	**Title**	**Description**
Phys 251, 251L Phys 252, 252L	University Physics I & II (8 semester hours)	The University physics sequence is for students majoring in science and engineering. Topics: Newtonian mechanics and gravitation, work and energy, rotational dynamics, vibrations and waves, mechanics of solids and fluids, basic kinetic theory, equations of state, and the first and second laws of thermodynamics, electricity and magnetism, electromagnetic waves, light and geometrical optics. The laboratory is a co-requisite of each course.
Activities encountered to meet the standard:		Lectures, labs, exams
pdf of course syllabus attached	*see Physics department report*	

Course addressing standard

Number	**Title**	**Description**
Biol 150, 151 Biol 150L, 151L	General Biology I & II General Biology I & II Lab (8 semester hours)	Basic concepts of biology with emphasis on life's diversity, processes, and man's place in nature.
Activities encountered to meet the standard:		Lectures, labs, exams
pdf of course syllabus attached	*Biol151labsyllabus* , *Biol151Syllabus* , *Biol150labsyllabus*, *Biol150Syllabus*	

4 Study of mathematics through calculus (minimum of one semester of calculus) and statistics

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Calculus I, II & III (Math 165, 166, 265) are required for candidates following option (A) above. Candidates following option (B) are advised to take Calculus I & II, instead of the Applied Calculus (Math 146) normally recommended for that option. Statistics is covered in the chemistry course sequence, primarily in upper division laboratory courses, including the courses

in the Analytical sequence (e.g. Chem 333), and in Physical Chemistry Laboratory. Instrumental Analysis (Chem 461), in particular requires extensive quantitative analysis of data collected in experiments.

Applied Statistical Methods, (Math 321, 3 cr) or Introduction to Statistics, (Psyc 241, 4 cr) is required for B.S.ED., with major in Science.

Course addressing standard

Number	**Title**	**Description**
Math 165	Calculus I	Limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of calculus
Activities encountered to meet the standard:		Lecture, exams
pdf of course syllabus attached	*Math165 - Calculus I*	

Course addressing standard

Number	**Title**	**Description**
Math 321	Applied Statistical Methods	Introductory statistics for students with a background in single variable calculus. Topics include descriptive statistics, continuous and discrete probability density functions, sampling distributions, point and interval estimation, and tests of hypotheses.
Activities encountered to meet the standard:		Lectures, exams
pdf of course syllabus attached	*Math321 - Statistics*	

Course addressing standard/assessments

Number	**Title**	**Description**
Chem 333	Introductory Environmental, Clinical, and Forensic Chemical Analysis	For all science majors interested in using analytical chemistry techniques in a modern science laboratory. Principles of quantitative and qualitative chemical analysis ass applied to environmental, clinical, and forensic science are covered.
Activities encountered to meet the standard:		Lectures, labs, quizzes, exams
Assessments	**How assessment measures meeting of standards**	
Lab 5 (lab-5.pdf, lab_5.xls.pdf)	Modern technology for analysis of sulfur in coal using ion chromatography in a laboratory experiment; data analysis using spreadsheet graphs and statistical analysis	
Lab 6 (lab_6_333.pdf, lab_6_333.xls,pdf, lab_6_333.xls2.pdf)	Spectrophotometry used to analyze protein solutions; data analysis using spreadsheet graphs and statistical analysis	
pdf of course syllabus attached	syllabus-detail 333 2006 with lab.pdf	

Results

a. Praxis II results for Chemistry: *see above*
b. Results of other content knowledge assessment(s).

Item	Number taking	Number passing	Percentage passing	Average score	High score	Low score

	assessment					
Chem 333 Lab 5 F06	45	44	97.8	35.7/40	40	18
Chem 333 Lab 6 F06	45	44	97.8	36.2/40	40	21

Student Work Samples

1 *lab_6_333.xls.pdf* *student lab report*
lab_6_333.xls2.pdf *student lab report*
lab_6_333.pdf *student work 37/40*
2 *lab_5.xls.pdf* *student lab report*
lab_5.pdf *student lab report*

13010.2, 13020.2, 13035.2, 13045.2, 13047.2, 13050.2 NATURE OF SCIENCE

The program requires study of the history and philosophy of science as well as the interrelationships among the sciences. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Part of the background material in General Chemistry (Chem 221) concerns the history of chemistry and its interrelationship with other sciences, particularly physics. Upper division courses often include interdisciplinary examples to illustrate chemical concepts. Organic chemistry includes studies of reactions that are historical fundamental concepts in the field. Other reactions studied apply specifically to medicinal applications.

Course addressing standard/assessments

Number	**Title**	**Description**
Chem 342 L	Organic Chemistry II Lab	Laboratory to accompany Chem 342.
Activities encountered to meet the standard:		Lectures, labs, quizzes, exams

Assessments	**How assessment measures meeting of standards**
Chem 342L Friedel_Crafts	Historical Friedel-Crafts alkylation Reaction studied
Chem 342L Aspirin	historical Asprin preparation studied
Chem 342L Final Exam Sp07	Synthesis of nylon understanding tested
pdf of course syllabus attached	*See above* (342L-07-sylabus)

Results

a. Praxis II results for Chemistry: *see above*
b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 342L, final Su07	17	14	82.4%	58.6/100	63	14.5
Chem 342L final Sp07	78	61	78.2%	45/70	67	6

Students Work Samples

1 *Ch342LSp05Final.good.pdf.pwp*

	Ch342LSp05Final.poor.pdf.pwp		
2	*Chem342L Aspirin.pdf*	*good student's work*	*[sp05]*
3	*Chem342L Friedel_Crafts.pdf*	*good student's work*	*[sp05]*

13010.3, 13020.3, 13035.3, 13045.3, 13047.3, 13050.3 INQUIRY

The program requires study of the processes of science common to all scientific fields. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

In General Chemistry (Chem 221), fundamental processes of science are included as part of the basic material covered. Both historical and current perspectives are included. Hands-on work in the laboratory courses involves students in exploring the scientific method, which is common to all scientific fields.

Course addressing standard/assessments

Number	**Title**	**Description**
Chem 333 /L	Introductory Environmental, Clinical, and Forensic Chemical Analysis & Lab	For all science majors interested in using analytical chemistry techniques in a modern science laboratory. Principles of quantitative and qualitative chemical analysis ass applied to environmental, clinical, and forensic science are covered.
Activities encountered to meet the standard:		Lectures, labs, quizzes, exams
Assessments		**How assessment measures meeting of standards**
Lab 5 (lab-5.pdf, lab_5.xls.pdf)		Use of scientific method and data analysis, in completing and reporting laboratory experiments
Lab 6 (lab_6_333.pdf, lab_6_333.slx,pdf, lab_6_333.xls2.pdf)		Use of scientific method and data analysis, in completing and reporting laboratory experiments
pdf of course syllabus attached		syllabus-detail 333 2006 with lab.pdf

Course addressing standard

Number	**Title**	**Description**
Chem 342L	Organic Chemistry II Lab	Laboratory to accompany Chem 342.
Activities encountered to meet the standard:		Lectures, labs, exams, quizzes
Assessments		**How assessment measures meeting of standards**
Chem342L Friedel_Crafts.pdf		Use of scientific method and data analysis, in completing and reporting laboratory experiments
Chem342L Aspirin.pdf		Use of scientific method and data analysis, in completing and reporting laboratory experiments
pdf of course syllabus attached		*See above* (342L-07-sylabus)

Results

a. Praxis II results for Chemistry – *see above*

b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 342L Friedel-Crafts exp	17	17	100	27.3/30	30	21.5
Chem 333 Lab 5 F06	45	44	97.8	35.7/40	40	18
Chem 333 Lab 6 F06	45	44	97.8	36.2/40	40	21

Student Work Samples

1 *Chem342L Friedel_Crafts.pdf* *good student's work [sp05]*

2 *lab_6_333.xls.pdf* *student lab report*
lab_6_333.xls2.pdf *student lab report*
lab_6_333.pdf *student work 37/40*

3 *lab_5.xls.pdf* *student lab report*
lab_5.pdf *student lab report*

13010.4, 13020.4, 13035.4, 13045.4, 13047.4, 13050.4 CONTEXT OF SCIENCE

The program requires the study of the effect of social and technological context on the study of science and on the application and valuing of scientific knowledge. The program prepares candidates to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding. The program provides the candidate with an understanding of the relationship of science to industry, business, government, and multicultural aspects of a variety of communities. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Students become familiar with the varied ways that scientific knowledge impacts many aspects in their daily lives by way of the examples used in their studies that have origins in environmental, health, and industrial settings.

Course addressing standard/assessments

Number	**Title**	**Description**
Chem 342	Organic Chemistry II	*See above*
Activities encountered to meet the standard:		Lectures, exams, quizzes
Assessments	**How assessment measures meeting of standards**	
Chem 342 exam 4 Sp06	Students relate organic chemistry to professional, personal goals	
pdf of course syllabus attached	*See above* (Syllabus,Chem342-07)	

Course addressing standard/assessments

Number	**Title**	**Description**
Chem 333	Introductory Environmental, Clinical, and Forensic Chemical Analysis	For all science majors interested in using analytical chemistry techniques in a modern science laboratory. Principles of quantitative and qualitative chemical analysis ass applied to environmental, clinical, and

		forensic science are covered.
Activities encountered to meet the standard:		Lectures, labs, quizzes, exams
Assessments	**How assessment measures meeting of standards**	
Lab 5 (lab-5.pdf, lab_5.xls.pdf)	Modern ion chromatography for analysis of sulfur in coal in a laboratory experiment; data analysis using spreadsheet graphs and statistical analysis	
Lab 6 (lab_6_333.pdf, lab_6_333.xls,pdf, lab_6_333.xls2.pdf)	Spectrophotometry used to analyze protein solutions; data analysis using spreadsheet graphs and statistical analysis	
pdf of course syllabus attached	*See above* (syllabus-detail 333 2006 with lab.pdf)	

Results

a. Praxis II results for Chemistry – *see above*
b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 333 Lab 5 F06	45	44	97.8	35.7/40	40	18
Chem 333 Lab 6 F06	45	44	97.8	36.2/40	40	21

Student Work Samples

1	*lab_6_333.xls.pdf*	*student lab report*
	lab_6_333.xls2.pdf	*student lab report*
	lab_6_333.pdf	*student work 37/40*
2	*lab_5.xls.pdf*	*student lab report*
	lab_5.pdf	*student lab report*

13010.5, 13020.5, 13035.5, 13045.5, 13047.5, 13050.5 SKILLS OF TEACHING

The program requires the candidate to demonstrate proficiency in methods of teaching science. The program uses varied performance assessments of the candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

A copy of the syllabus from T&L 400, Science Teaching Methods is included that requires students to prepare and present demonstrations, assessments, and lesson plans. Students spend time in class observing various styles of presentation for labs, demonstrations, and assessment. Then they develop and present their own lessons, demonstrations, assessments, and grading (using rubrics and gradepower.com (a free website developed by Dr. Helgeson for teachers to use in grading student progress). The syllabus includes a variety of activities

by which students learn how to promote the development and use of a variety of science skills, e.g,, measurement, observation, inference, data analysis, data presentation, etc.

Assessments

a. Course Grades
b. Student Teaching Evaluations

Results

a. Course Grades

Fall 06 & Fall 07	Methods and Materials - Science				
T&L 400	A	B	C	D	F
N=12	12/100%	___	___	___	___

b. Student Teaching Evaluation

	Mid Term N=2				**Final N=2**			
Chemistry Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
1. Demonstrates knowledge of content:	0%	50%	50%	0%	0%	0%	100%	0%
2. Demonstrates knowledge of human development through appropriate interaction, activities & attitude:	0%	100%	0%	0%	0%	50%	50%	0%
3. Recognizes individual differences and gives opportunities for diverse learners to learn:	0%	100%	0%	0%	0%	100%	0%	0%
4. Employs diverse teaching strategies:	0%	50%	50%	0%	0%	50%	50%	0%
5. Demonstrates competence in employing appropriate technology:	0%	100%	0%	0%	0%	0%	100%	0%
6. Fosters a safe, compassionate, and respectful educational environment that promotes learning:	0%	100%	0%	0%	0%	50%	50%	0%

7. Guides student behavior effectively and appropriately:	0%	100%	0%	0%	0%	50%	50%	0%
8. Express ideas articulately in written and oral communication:	0%	0%	100%	0%	0%	0%	100%	0%
9. Solicits suggestions and feedback from other and is receptive to them:	0%	50%	50%	0%	0%	50%	50%	0%
10. Plans and designs creative, organized, effective, and appropriate lessons and units:	0%	50%	50%	0%	0%	50%	50%	0%
11. Uses appropriate informal and/or formal assessment method to evaluate:	0%	50%	50%	0%	0%	50%	50%	0%
12. Analyzes own performance and seeks sources of improvement:	0%	100%	0%	0%	0%	50%	50%	0%
13. Maintains professional conduct-punctuality, interaction with others, preparedness, and initiative:	0%	50%	50%	0%	0%	0%	100%	0%
14. Established effective relationships with parents, participates in school and community projects:	0%	100%	0%	0%	0%	50%	50%	0%

Evaluations at both mid and end student teaching show that the candidates are proficient in the teaching of science.

Student Work Samples related to teach are available in the Hard Copy exhibits.

13010.6, 13020.6, 13035.6, 13045.6, 13047.6, 13050.6 CURRICULUM

The program provides candidates with information necessary to identify, evaluate, and apply a coherent, focused science curriculum that is consistent with state and national standards for science education and appropriate for addressing the needs, abilities and interests of students. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

Students conduct experiments and activities from three major curriculum projects: Project WET, Project Learning Tree, and SEPUP (Science Education for Public Understanding Program. All these curriculum projects are recognized at the national level as exemplary science education programs and all address the National Science Education Standards. Students are required to become members of the National Science Educators Association (NSTA), for which they receive a quarterly newspaper that addresses recent legislation, new curriculum, content and material evaluation of new books and science supplies. In addition students receive information about regional and national science education conferences.

Assessments

a. Course Grades
b. Student Teaching Evaluations

Results

a. Course Grades

Fall 06 & Fall 07	Methods and Materials - Science				
T&L 400	A	B	C	D	F
N=12	12/100%	___	___	___	___

b. Student Teaching Evaluation

	Mid Term N=2				**Final N=2**			
Chemistry Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
1. Demonstrates knowledge of content:	0%	50%	50%	0%	0%	0%	100%	0%

2. Demonstrates knowledge of human development through appropriate interaction, activities & attitude:	0%	100%	0%	0%	0%	50%	50%	0%
3. Recognizes individual differences and gives opportunities for diverse learners to learn:	0%	100%	0%	0%	0%	100%	0%	0%
4. Employs diverse teaching strategies:	0%	50%	50%	0%	0%	50%	50%	0%
5. Demonstrates competence in employing appropriate technology:	0%	100%	0%	0%	0%	0%	100%	0%
6. Fosters a safe, compassionate, and respectful educational environment that promotes learning:	0%	100%	0%	0%	0%	50%	50%	0%
7. Guides student behavior effectively and appropriately:	0%	100%	0%	0%	0%	50%	50%	0%
8. Express ideas articulately in written and oral communication:	0%	0%	100%	0%	0%	0%	100%	0%
9. Solicits suggestions and feedback from other and is receptive to them:	0%	50%	50%	0%	0%	50%	50%	0%
10. Plans and designs creative, organized, effective, and appropriate lessons and units:	0%	50%	50%	0%	0%	50%	50%	0%

11. Uses appropriate informal and/or formal assessment method to evaluate:	0%	50%	50%	0%	0%	50%	50%	0%
12. Analyzes own performance and seeks sources of improvement:	0%	100%	0%	0%	0%	50%	50%	0%
13. Maintains professional conduct- punctuality, interaction with others, preparedness, and initiative:	0%	50%	50%	0%	0%	0%	100%	0%
14. Established effective relationships with parents, participates in school and community projects:	0%	100%	0%	0%	0%	50%	50%	0%

Evaluations at both mid and end student teaching show that the candidates are proficient in the knowledge about teaching of science.

13010.7, 13020.7, 13035.7, 13045.7, 13047.7, 13050.7 ASSESSMENT

The program prepares candidates to use a variety of performance assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science.
Where in your program do candidates have the opportunity to address/meet this standard?
T&L 400 Secondary Science Methods syllabus attached that shows the requirement to develop assessments of student content knowledge, skills, and problem solving strategies.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

T&L 400 Secondary Science Methods syllabus attached that shows the requirement to develop assessments of student content knowledge, skills, and problem solving strategies.

Students prepare Multiple Choice exam questions, Open ended exam questions with accompanying rubrics, and Performance Based Assessment and Rubrics. The course includes extensive discussion of National and State testing for teachers and high school and middle school students.

Assessments

a. Course Grades

b. Student Teaching Evaluations

Students are also evaluated by their in-class discussion and performance related to this standard. The professor teaching the course spends a significant amount of time on the problem of relating the type of assessment to the activities in class and to the style of teaching a lesson. In addition students learn how to assign and defend weighted grades using the website gradepower.com. In that web site they learn how to communicate with students about grades, weight and give grades, and student teachers engage in extensive discussion on the philosophies and ideologies related to grades, evaluation, and assessment.

Results

a. Course Grades

Fall 06 & Fall 07	Methods and Materials - Science				
T&L 400	A	B	C	D	F
N=12	12/100%	—	—	—	—

b. Student Teaching Evaluation

	Mid Term N=2				**Final N=2**			
Chemistry Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
1. Demonstrates knowledge of content:	0%	50%	50%	0%	0%	0%	100%	0%
2. Demonstrates knowledge of human development through appropriate interaction, activities & attitude:	0%	100%	0%	0%	0%	50%	50%	0%
3. Recognizes individual differences and gives opportunities for diverse learners to learn:	0%	100%	0%	0%	0%	100%	0%	0%
4. Employs diverse teaching	0%	50%	50%	0%	0%	50%	50%	0%

strategies:								
5. Demonstrates competence in employing appropriate technology:	0%	100%	0%	0%	0%	0%	100%	0%
6. Fosters a safe, compassionate, and respectful educational environment that promotes learning:	0%	100%	0%	0%	0%	50%	50%	0%
7. Guides student behavior effectively and appropriately:	0%	100%	0%	0%	0%	50%	50%	0%
8. Express ideas articulately in written and oral communication:	0%	0%	100%	0%	0%	0%	100%	0%
9. Solicits suggestions and feedback from other and is receptive to them:	0%	50%	50%	0%	0%	50%	50%	0%
10. Plans and designs creative, organized, effective, and appropriate lessons and units:	0%	50%	50%	0%	0%	50%	50%	0%
11. Uses appropriate informal and/or formal assessment method to evaluate:	0%	50%	50%	0%	0%	50%	50%	0%
12. Analyzes own performance and seeks sources of improvement:	0%	100%	0%	0%	0%	50%	50%	0%
13. Maintains professional conduct-punctuality, interaction with others, preparedness, and initiative:	0%	50%	50%	0%	0%	0%	100%	0%
14. Established effective relationships								

with parents, participates in school and community projects:	0%	100%	0%	0%	0%	50%	50%	0%

Evaluations at both mid and end student teaching show that the candidates are proficient in the knowledge about teaching of science and assessment of student learning.

Student Work Samples: I-movies of projects as well as sample of student work are available in Hard Copy Exhibits

13010.8, 13020.8, 13035.8, 13045.8, 13047.8, 13050.8
ENVIRONMENT FOR LEARNING

The program prepares candidates to design and manage safe and supportive learning environments in the classroom, laboratory, and field. The program reflects high expectations for the success of all students. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

T&L 401 School Science Safety - Science: Prepares students to plan for and communicate about a wide variety of classroom and laboratory safety issues. Health and safety issues are examined for the classroom teacher and the students in all science courses, including electrical safety, biological safety, chemical use, storage and disposal, legal issues, liability reduction and cost control are also addressed in detail.

T&L 400 Secondary Science Teaching Methods and T&L 401 School Science Safety address these standards. Syllabi show that students develop observational lists that help them to clarify in their own minds what an ideal laboratory/science environment should be. With regard to safety in the science room students are required to carry out evaluations of classroom in existing schools, assess ventilation within the classroom, assess storage and disposal procedures for chemicals, and to understand the safety requirements in Chemistry, Biology, Physics, Environmental studies, and on field trips. They learn extensively about the law and teacher responsibility in maintaining a safe learning environment.

Students must pass examinations in Safety related to the areas Chemical, Biological, and Physics science safety as part of this course.

Assessments

a. Course Grades
    1. T&L 400
    2. T&L 401
b. Student Teaching Evaluations
c. Safety Exam Results

Results

A.1 Course Grades

Fall 06 & Fall 07	Methods and Materials - Science				
T&L 400	A	B	C	D	F
N=12	12/100%	—	—	—	—

A.2 Course Grades

Fall 07	School Safety - Science				
T&L 400	A	B	C	D	F
N=5	5/100%	—	—	—	—

b. Student Teaching Evaluation

	Mid Term N=2				**Final N=2**			
Chemistry Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
1. Demonstrates knowledge of content:	0%	50%	50%	0%	0%	0%	100%	0%
2. Demonstrates knowledge of human development through appropriate interaction, activities & attitude:	0%	100%	0%	0%	0%	50%	50%	0%
3. Recognizes individual differences and gives opportunities for diverse learners to learn:	0%	100%	0%	0%	0%	100%	0%	0%
4. Employs diverse teaching strategies:	0%	50%	50%	0%	0%	50%	50%	0%
5. Demonstrates competence in employing appropriate technology:	0%	100%	0%	0%	0%	0%	100%	0%
6. Fosters a safe,								

compassionate, and respectful educational environment that promotes learning:	0%	100%	0%	0%	0%	50%	50%	0%
7. Guides student behavior effectively and appropriately:	0%	100%	0%	0%	0%	50%	50%	0%
8. Express ideas articulately in written and oral communication:	0%	0%	100%	0%	0%	0%	100%	0%
9. Solicits suggestions and feedback from other and is receptive to them:	0%	50%	50%	0%	0%	50%	50%	0%
10. Plans and designs creative, organized, effective, and appropriate lessons and units:	0%	50%	50%	0%	0%	50%	50%	0%
11. Uses appropriate informal and/or formal assessment method to evaluate:	0%	50%	50%	0%	0%	50%	50%	0%
12. Analyzes own performance and seeks sources of improvement:	0%	100%	0%	0%	0%	50%	50%	0%
13. Maintains professional conduct-punctuality, interaction with others, preparedness, and initiative:	0%	50%	50%	0%	0%	0%	100%	0%
14. Established effective relationships with parents, participates in school and community projects:	0%	100%	0%	0%	0%	50%	50%	0%

Evaluations at both mid and end student teaching show that the candidates are proficient in creating a safe and engaging learning environment.

Student Work Samples

Samples of examinations are included in the Hard Copy Exhibits.

13010.9, 13020.9, 13035.9, 13045.9, 13047.9, 13050.9 PROFESSIONAL PRACTICE

The program prepares candidates to participate in the professional community, improving practice through their personal actions, education, and development. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

Students enrolled in T&L 400 are required to become members of the National Science Teachers Association in order to receive either the journal "Science Scope" or "The Science Teacher" and the NSTA quarterly newspaper, and have access to professional conference information. Students in T&L 400 discuss NSTA journal articles and NSTA newspaper articles that included recent legislation and trends in science education, and these are all discussed in class at great length. The membership in NSTA is in lieu of a textbook for the class as the documents that come with membership provide in-depth reviews of current trends and legislation related to science education. In addition students carry out extensive discussion of their Field Experience (T&L 486) and complete an evaluation of the Laboratory Safety in their schools and make a list of observations in their assigned Field Experience school laboratories and materials (books and equipment) and curriculum.

Assessments

a. Course Grades
b. Student Teaching Evaluations

Results

a. Course Grades

Fall 06 & Fall 07	Methods and Materials - Science				
T&L 400	A	B	C	D	F
N=12	12/100%	—	—	—	—

b. Student Teaching Evaluation

	Mid Term N=2				**Final N=2**			
Chemistry Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
1. Demonstrates knowledge of content:	0%	50%	50%	0%	0%	0%	100%	0%
2. Demonstrates knowledge of human development through appropriate interaction, activities & attitude:	0%	100%	0%	0%	0%	50%	50%	0%
3. Recognizes individual differences and gives opportunities for diverse learners to learn:	0%	100%	0%	0%	0%	100%	0%	0%
4. Employs diverse teaching strategies:	0%	50%	50%	0%	0%	50%	50%	0%
5. Demonstrates competence in employing appropriate technology:	0%	100%	0%	0%	0%	0%	100%	0%
6. Fosters a safe, compassionate, and respectful educational environment that promotes learning:	0%	100%	0%	0%	0%	50%	50%	0%
7. Guides student behavior effectively and appropriately:	0%	100%	0%	0%	0%	50%	50%	0%
8. Express ideas articulately in written and oral communication:	0%	0%	100%	0%	0%	0%	100%	0%
9. Solicits suggestions and feedback from other and is receptive to them:	0%	50%	50%	0%	0%	50%	50%	0%
10. Plans and designs creative, organized,	0%	50%	50%	0%	0%	50%	50%	0%

effective, and appropriate lessons and units:								
11. Uses appropriate informal and/or formal assessment method to evaluate:	0%	50%	50%	0%	0%	50%	50%	0%
12. Analyzes own performance and seeks sources of improvement:	0%	100%	0%	0%	0%	50%	50%	0%
13. Maintains professional conduct-punctuality, interaction with others, preparedness, and initiative:	0%	50%	50%	0%	0%	0%	100%	0%
14. Established effective relationships with parents, participates in school and community projects:	0%	100%	0%	0%	0%	50%	50%	0%

Evaluations at both mid and end student teaching show that the candidates are proficient in establishing positive relationships with community members.

Student Work Samples
T&L 400 work samples are available in the Hard Copy exhibits.

13010.10, 13020.10, 13035.10, 13045.10, 13047.10, 13050.10 TECHNOLOGY
The program requires the study of current, appropriate instructional technologies. The program uses varied performance assessments of candidates' understanding and abilities to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

A number of chemistry courses expose students to a variety of instructional technologies. CD-ROM supplements are part of the text package in General Chemistry, and thus accessible to every student. Students in Organic Chemistry classes make use of web-based supplements, and Physical Chemistry courses use a variety of mathematical and computational software, including Mathematica and HyperChem. Additionally, many courses utilize UND's electronic Blackboard, a prevalent form of online instructional technology, as an assessment tool.

Course addressing standard

Number	**Title**	**Description**
Chem 341	Organic Chemistry I	*see above*
Activities encountered to meet the standard:		online assignments using Blackboard
Assessments	**How assessment measures meeting of standards**	
Ch341Q1 F07	Electronic Bb used for a quiz	
pdf of course syllabus attached	*see above* (CHEM341_syllabusF07.pdf)	

Course addressing standard

Number	**Title**	**Description**
Chem 333	Introductory Environmental, Clinical, and Forensic Chemical Analysis	*see above*
Activities encountered to meet the standard:		Labs, quizzes
Assessments	**How assessment measures meeting of standards**	
Lab 5 (lab-5.pdf, lab_5.xls.pdf)	Use of spreadsheets in data tabulation, graphing, statistical analysis	
Liquid chromatography quiz Chem333.pdf	Use of electronic Blackboard to complete a quiz	
pdf of course syllabus attached	*see above* (syllabus-detail 333 2006 with lab.pdf)	

Results

a. Praxis II results for Chemistry – *see above*
b. Results of other content knowledge assessment(s).

Item	Number taking assessment	Number passing	Percentage passing	Average score	High score	Low score
Chem 341 quiz 1 F07	165	131	79%	3.8/5	5	0
Chem 333 Lab 5 F06	45	44	97.8	35.7/40	40	18
Chem 333 LC quiz F06	56	55	98.2	7.31/7.5	7.5	4

Student Work Samples

Ch 341Q1 F07a.pdf.pwp – *good student*
Ch 341Q1 F07b.pdf.pwp -- *poorer student*
lab_5.xls.pdf, lab_5.pdf

13010.11

Candidate assessment data are regularly and systematically collected, compiled, aggregated, summarized, and analyzed to improve candidate performance, program quality, and program operations. The program disaggregates candidate assessment data when candidates are in alternate route, off-campus, and distance learning programs.

Teaching & Learning Undergraduate Assessment Plan

Data Collection. Data are collected at transition points throughout the program to assess candidate performance, program quality and program operations. The Teaching and Learning Undergraduate Assessment Committee (UGAC) develops an annual schedule for the purposes of

data collection. T&L undergraduate faculty who assess critical tasks, staff in the Office of Advising and Admissions and staff in the Office of Field Experience are responsible for submitting data presented in the table below. The UGAC monitors the collection process and follows up in a timely manner when data is missing.

Data Analysis and Reporting. The UGAC is responsible for submitting an annual report to the undergraduate faculty in the Department of Teaching and Learning, the Chair of Teaching and Learning and the Associate Dean for Teacher Education (NCATE Coordinator) based upon a detailed analysis of data collected over the course of the previous year. The Assessment Committee facilitates an annual Assessment Retreat. Faculty discuss the report at the departmental and individual program level and develop a written plan of action designed to address areas of weakness. Should no areas of weakness be found, a written record of faculty discussion leading to this conclusion is created. In between assessment retreats, the UGAC monitors progress in the implementation of the action plan(s). In subsequent retreats, the action plans are revisited and revised in light of the new round of data analysis.

Unit Assessment System for the Elementary Education Program

Initial Programs Undergraduate	Upon Admission to Teacher Education	Before Entering Student Teaching	Before Program Completion	After Completion
• Elementary • ECE/Elementary • Elementary/Middle	• GPA • PPST Score • Letter of Application • Dispositions	• Critical Tasks (Child Study, Multicultural Teaching, Lesson Plan, Beliefs and Practices Statement) • Praxis II Tests • Dispositions	• Critical Tasks (Mid-term Evaluation, Final Evaluation • Dispositions	Assessments: • Graduate Surveys • Principal Surveys

II. Multicultural/Native American /Diversity Standard

The program requires the study of multicultural education including Native American studies and strategies for teaching and assessing diverse learners.

This response is prepared for all programs approved by ESPB. If you are reviewing an undergraduate or initial program only, please read the sections of this response headed *Initial Programs.* For Advanced or Professional Programs, please read the sections of this response headed *Advanced Programs*. Syllabi, vita and cited electronic work samples referred to in the report may be found in the folder labeled "MC-Diversity Standard."

MULTICULTURAL EDUCATION/NATIVE AMERICAN STUDY

Initial Programs

Opportunity to Address/Meet Standard

T&L 433: Multicultural Education: All candidates in the Teacher Education Program at the University of North Dakota are required to complete this course (There is also a correspondence course with the same prefix and title which is offered to those who are in non-UND programs. Rarely, an exception is made for a candidate in the program who is unable to take the on-campus course.)

Course Description

This class takes an anthropological view of multicultural education. It will help students better understand students in culturally diverse classrooms as well as prepare them to teach about cultural diversity. This class examines several cultures but is particularly interested in American Indians of North Dakota. Those original groups include: Lakota, Dakota, and Nakota, Chippewa, and the three affiliated tribes: Mandan, Hidatsa, and Arikara (see attached sample syllabus TL 433).

Assessments/Results

1. Critical Task: Multicultural Teaching is submitted and assessed in LiveText, an on-line data management system. This Critical Task is a research paper based upon an issue in multicultural education. The paper includes a lesson plan which is assessed to determine candidates' ability to apply what they have learned related to diversity. The task was piloted in the spring of 2007 and assessed formally for the first time in the fall of 2007.

Initial Programs Critical Task Assessment Results for Multi-Cultural Teaching

Fall 2007 N=90

Teaching & Learning Standards	Does Not Meet	Fulfills Expectations	Exceeds Expectations
1.2 Teacher candidate uses tools of inquiry to develop content knowledge.	13%	56%	30%
1.3 Teacher candidate selects content to encourage diverse perspectives.	13%	53%	33%
6.2 Teacher candidate uses language to promote learning (e.g., use questioning skills, discussion techniques, delivery style, nonverbal cues).	14%	56%	29%

6.3 Teacher candidate uses media and technology as effective learning and communication tools.	13%	36%	30%
6.6 Teacher candidate's communication skills facilitate partnerships with students, families and colleagues.	15%	52%	32%

Standards 1.3 and 6.6 especially target candidates knowledge and dispositions related to diversity. As indicate in the table 84%-86% of candidates meet or exceed expectations in these categories.

2. Mid-Term Showcase: Candidates work in pairs to create a showcase of a culture that includes engaging hands on learning activities.

Fall 2007	**Multicultural Ed**				
TL433: Section 1: Midterm Showcase Scores	A	B	C	D	F
N = 30	# 30 100%	0%	0%	0%	0%

3. Native American Reservation Field Trip: The class participates in a field trip, to an American Indian reservation school K-12. Each candidate is expected to write a 3-5 page paper reflecting on the field experience. At a minimum, the student should provide answers to the following questions after the field experience: (a) What does education and learning experiences mean to these students; (b) Is the educational system ensuring that the diverse needs of those students are met?

The field trip reflection assessment rubric covers three areas:
(a) Focus (i.e. relevant, specific and clear response to the above questions....10 points);
(b) Perspective (i.e. the student reflects on the field trip from a diverse/multiple perspective...10 points);
(c) Language/Grammar (i.e., the students uses appropriate diversity terminology/ language as well as correct grammar...5 points).

TL 433 Section 1:Fall 2007	A	B	C	D
Field Trip Reflection Scores (N=30)	#26 87%	#4 13%	#0	#0

Student Work Samples

1. For candidate work related to the critical task (#1 above), please click on the any of the documents below:

- Sample 1 Does Not Meet Expectations
- Sample 2 Meets Expectations
- Sample 3 Exceeds Expectations

2. A variety of student work samples related to the showcase will be available in the hard copy exhibit room.

Advanced Programs
Opportunity to Address/Meet Standard

EFR 506: Multicultural Education: Candidates who have not taken T&L 433 as undergraduates are encouraged to take this course. As described in the catalog the course is a "review of the conceptual, historical, and theoretical aspects of multicultural education. A major goal will be to provide educators with the processes for incorporating multicultural education into their own education environments to meet the needs of their culturally diverse students and to increase the cultural awareness and sensitivity of all students. North Dakota/Native American issues are primary elements of this course" (pg.249). (Also, see attached sample syllabi: EFR 5061; EFR5062.

Assessments/Results:
Course Grades

Sections 1-4: SU, 2007					
Course EFR 506: Multicultural Education	A	B	C	D	F
N=28	# 26 93%	#1 3.5%	#0 %	#0 %	#1 3.5%

As indicated by the majority of A's and B's in the chart above, candidates taking this course met or exceeded course goals.

STRATEGIES FOR TEACHING AND ASSESSING DIVERSE LEARNERS
Initial Programs

Opportunity to Address/Meet Standard

T&L 315: Education of Exceptional Students: All candidates in our Early Childhood Education, Elementary Education and Middle Level programs are required to take this course(see attached syllabus T&L 315).

Course Description: "An orientation course, especially for classroom teachers, stressing the identification, characteristics and educational problems of exceptional children" (college catalog p.184).

TEAM Methods: Candidates in Elementary Education, Early Childhood Education and Middle Level Education take a series of methods related courses that require them to demonstrate an ability to accommodate instruction for students with special needs. Initially, candidates are presented with a case of a virtual student. They view a video and review an IEP and create a lesson plan with accommodations for this student (see IEP of Nathan). Next, candidates complete a 60-hour field experience. They select a lesson for assessment that includes accommodations for one or more students in their field experience setting.

Integration of Special Needs: The secondary education program has developed an integrated approach to guide candidates' knowledge about and skill in teaching diverse

learners (see Integration of Special Needs within the Secondary Education Program document).

Assessments/Results
Course Grades

Fall 06 - Spring 07					
Course TL 315: Education of Exceptional Students	A	B	C	D	F
N=197	#148 75%	#34 18%	#7 3%	#4 2%	#4 2%

Over 93% of candidates from spring 2006 to fall of 2007 met or exceeded expectations related to the content of TL315 as demonstrated by the percent of A's and B's awarded.

TEAM Methods: Candidates development and implement a lesson plan and during the 60 hour field experience tied to the methods semester that is submitted and assessed in LiveText, an on-line data management system. INTASC Standard 3 and Program Standard 3.1 are assessed to determine candidates' abilities to accommodate all learners needs. Results from fall 2006-spring 2007 are presented in the table below:

Standard: 3.2 TAAL INTASC 3 Teacher candidate plans and adapts instruction for individual needs	Not Met	Met	Exceeds
Fall 2006	6.4%	70.2%	23.4%
Spring 2007	13.8%	74.2%	12%

During the 2006-2007 academic year 87.2%-94.6% of candidates met or exceeded the standard related to adapting instruction. The faculty reviewed data in May of 2007 and were disappointed in the lower results in the spring semester. It was at this point that the case of Nathan was developed for implementation in the fall of 2007. We hope to see improvements during the 07-08 academic year.

Integration of Special Needs: Candidates development and implement a lesson plan and during the 60 hour field experience tied to the methods semester that is submitted and assessed in LiveText, an on-line data management system. INTASC Standard 3 and Program Standard 3.1 are assessed to determine candidates' abilities to accommodate all learners needs. The Lesson Plan for secondary programs is submitted and scored only in the fall since this is when the methods courses are offered. At the time of this report, no results are available. Results for fall 2007 will be available in the spring of 2008.

Student Teaching Evaluations: Mid-term and final evaluations during the student teaching semester provide additional evidence that candidates in all of our programs address the needs of diverse learners in their classrooms. Cooperating Teachers and University Supervisors complete these evaluations at mid and end term during the student teaching semester. The results for candidates' in the area of exceptionalities in the fall 2006 and spring 2007 are presented in the table below:

INTASC Standard 3: Teacher candidate plans and adapts instruction for individual needs								
	Mid Term N = 86				**Final N =86**			
Fall 06-Spring 07	Deficient	Developing	Proficient	Not Observed	Deficient	Developing	Proficient	Not Observed
All Programs	0%	30%	58%	12%	0%	10%	75%	15%

As noted in the evaluations 85%-88% of candidates during student teaching are able to adequately address this standard. In addition, 20% of candidates moved from the developing to proficient category by the end of the their student teaching assignment.

Advanced Programs
Opportunity to Address/Meet Standard

EFR 506: Multicultural Education: Candidates who have not taken T&L 433 as undergraduates are encouraged to take this course. The emphasis of the course may vary dependent upon the semester. For example, in the summer of 2007 one section of EFR 506 emphasized issues in special education within the context of the multicultural framework (see syllabus EFR 506).

Assessment /Analysis

Course Grades

Course	A	B	C	D	F
EFR 506: Multicultural Education: Sec3: SU, 2007 N=14	#12 86%	#1 7%	# 0%	# 0%	#1 7%

As indicated by the majority of A's and B's in the chart above, candidates taking this course met or exceeded course goals.

Other important diversity aspects are part of the curriculum in the required courses of EFR 500: Philosophical Foundations of Education, TL 540: Philosophies and Theories of Curriculum, and TL 542: Models of Teaching. In addition, the candidate is required to take an additional three credits of foundations. Typically, they are advised to take EFR 505: Social Foundations of Education or EFR 507 Gender and Education; in either of these latter two courses, candidates study multicultural education, diversity education, and socioeconomic aspects related to access, equality, and equity.

TL 590 ST: Children's Literature in the Classroom. In this course, candidates in the reading specialist and elementary education advanced programs read multicultural literature and critique literature used in classrooms to determine its resonance with all students. Further, students complete projects which explore Native American Literature. The syllabus for TL590ST states the following goal:

- Expand your knowledge of the wealth of literature available for diverse children in classrooms (NBPTS #2)

The goal is met through reading and discussing articles and children's literature and by assignments. Sample readings and assignments are provided to illustrate candidate experiences.

Sample articles on diverse learners (cultural, racial, gender, socioeconomic)

- Enteneman, J., Murnen, T. J., & Hendricks, C. (2005). Victims, bullies, and bystanders in K-3 literature. *The Reading Teacher, 59,* pp. 352-364.
- Livingston, N. & Kurkjian, C. (2005). Circles and celebrations: Learning about other cultures through literature. *The Reading Teacher, 58,* pp. 696-703.
- Louie, B. L. Guiding princiles for teaching multicultural literature. *The Reading Teacher, 59,* pp. 438-448.
- Wason-Ellam, L. (1997). "If only I was like Barbie." *Language Arts, 74*(6), pp. 430-437.
- Yenika-Agbaw, V. (1997). Taking children's literature seriously: Reading for pleasure and social change. *Language Arts, 74*(6), pp. 446-453.

Multicultural and gender-based literature assigned for the course and read by candidates:

- Curtis, C. P. (1995). *The Watsons Go To Birmingham*. Yearling. **ISBN:** 0440414121
- DiCamillo, K. (2000). *Because of Winn-Dixie*. Scholastic. **ISBN:** 043925051X
- Erdrich, L. (1999). *The Birchbark House*. Scholastic. **ISBN:** 0439203406
- Munsch, R. (1980). *The Paper Bag Princess*. Annick Press. **ISBN:** 0920236162
- Ryan, P. M. (2000). *Esperanza Rising*. Scholastic.

Artifacts supplied to illustrate multicultural course experiences are listed here and supplied for perusal.

- PowerPoint by candidate—Contemporary Native Americans and Literature
- Character Comparison between Esperanza in *Esperanza Rising* and Opal in *Because of Winn-Dixie*
- Key Discussant Grade Report on *Birchbark House* with bibliography of Native America book resources and teaching ideas
- Multicultural Book Analysis

TL 590 ST: Writing in the Elementary School Classroom. In part this course is designed to increase candidates' ability to effectively teach diverse children to write, respecting development, culture, gender, and individuality. Though meeting a goal such as this is integrated throughout the semester, specific course readings and activities are devoted to the goal. Readings on gender and writing, specifically paying attention to boys, and culturally conscious writing instruction is also addressed. Multicultural and gender-based readings include the following:

- Dworin, J. E. (2006). The family stories project: Using funds of knowledge for writing. *The Reading Teacher, 59*(6), 510-520.
- Dyson, A. H. (1998). Fold processes and media creatures: Reflections on popular culture for educators. *The Reading Teacher, 51*(5). 392-402.
- Fletcher, R. (2006). Boy writers: Reclaiming their voices. (Chapter 10). Portland, ME: Stenhouse Publishers.
- Fu, D. & Shelton, N.R. (2007). Including students with special needs in a writing workshop. *Language Arts, 84*(4), 325-336.
- Newkirk, T. (2000). Misreading masculinity: Speculations on the great gender gap in writing. *Language Arts, 77*(4), 294-300.

- Rubin, R. & Carlan, V. G. (2005). Using writing to understand bilingual children's literacy development. *The Reading Teacher, 58*(8), 728-739.

One artifact supplied to illustrate linguistic/cultural study of writers is a whole class effort to identify ways to support ELLs in the writing classroom. Candidates reviewed numerous books and articles, identified resources, and gleaned specific practical ideas for supporting young writers. The series of charts that evolved from that activity are supplied as an example of the type of learning event that is integrated in the course to learn about supporting multicultural learners in writing.

Programs for Other School Professionals
In addition to the instruction and assessment in the above programs, the following coursework in Educational Leadership and School Counseling attend to multicultural and diversity issues.

Educational Leadership:

Opportunity to Address/Meet Standard: Courses

EDL 514: Personnel, Supervision, and Staff Development: Various in-depth discussions regarding diversity occur (e.g., Native American and the BIA system). EDL 516 Policy and Educational Finance: Candidates conduct research on various schools, locations, and issues. An example of a research project may be an exploration of the funding for a Native American school.
EDL 519: The Principalship: Principals from various schools (including Indian Reservations) discuss the complexity of education and how it affects students, teachers, and communities.
EDL 501: Leadership, Planning, and Organizational Behavior: Studies include shaping school culture, addressing individual and group needs, setting goals and priorities according to the context of the community.
EDL 511: Personal Communications and Ethics: Discussions are held on how culture, age, and socioeconomics influences education.

Assessments Include:

Exams
Research Papers
Portfolios

School Counseling:

Opportunity to Address/Meet Standard: Courses

Coun 518: Group Theory and Process: Addresses the principles and practices of support, task, psycho-educational, and therapeutic groups with various populations in a multicultural context. Includes study of professional issues relevant to group processes, involves participation and leading group experiences.

Coun 531: Psychology of Women, Gender, and Development: This course presents current research and trends in developmental theory, particularly theories pertaining to

psychological development of women and men. Issues such as abuse, ageism, depression, eating disorders, emotional experience and expression, heterosexism, feminism, and multiculturalism will be examined as related to the practice of psychology. Learning methods include writing, music, film, group discussion and creative projects.

Coun 532: Multicultural Counseling: "This course offers an introduction to counseling theories and interventions appropriate for American ethnic and non-ethnic minority clients. The values suppositions of various cultural groups will be examined"(college catalog p. 24).

Assessments Include:

Papers
Exams
Presentations
Counselor Preparation Comprehensive Examination (CPCE)
Student Internship Evaluation Forms

1.

CURRICULUM EXHIBIT FORM BASIC PROGRAM

EDUCATION STANDARDS AND PRACTICES BOARD

SFN 14381 (05-06)

Institution: University of North Dakota		Major: Chemistry
Credits are:	Semester x	Quarter
Credits required for degree: 125		
General Studies	**Teaching Specialty**	**Professional Education**
Must total at least 39 credits	Credits required: 71	Credits 34-36 credits
Behavioral Sciences (9 Min) Electives in at least 2 areas from the following departments: Anthropology, A&S, Communication, CSD, Economics, Geography, History, Honors, Humanities, Indian Studies, Music, Nursing, Nutrition, Political Science, Psychology, Recreation and Leisure, Rehab Services, Sociology, Social work, Space Studies, T&L. **9 credits Total** Humanities (9 Min) Electives from at least 2 areas in the following departments: Art, EHD, English, Fine Arts, History, honors, Indian Studies, IT, Languages, Music, Philosophy, Political Science, Religion and Theater Arts. **9 credits Total** Natural Sciences (9 Min) Electives in at least 2 areas and 1 lab science from the following departments: Anthropology, Atmospheric Sci, Biology, Chemistry, Computer, Sci, Economics, Geography, Geology, Honors, Humanities, IT, Mathematics, Nutr and Dietetics, Philosophy, Physics, Psychology, Sociology and Space Studies **9 credits Total** Symbolic Systems (9 Min) Engl 110 Composition (3) Engl 120 Composition (3) Comm 110 Public Speaking (3) **OR** Engl 125 **OR** Advanced Composition Course **9 credits Total**	**Option A: Physical Science Emphasis:** Chem 221, 221L Fund. Of Chem Concepts (4) Chem 222, 222L Fund. of Chem, Analysis (4) Chem 333 Intro Env Clin Forens Analysis (4) **Or** Chem , 222L Quantitative Anal Lab (4) Chem 341,341L Organic Chem & Lab (5) Chem 342 342L Org. Chem & Lab II (5) Chem 461,461L Insturmental Analysis (5) Chem 462 Physical Chem Lab (3) Chem 464 Physical Chem I (3) Chem 465 Physical Chem II (3) Math 165 Calculus I (4) Math 165 Calculus II (4) Math 265 Calculus III (4) Phys 251/252 Gen Physics I,II (4,4) BMB 301 Biochemistry Lecture (3) Biol 150, 150Lab Gen Biology I (4) Biol 151, 151Lab Gen Biology II (4) Earth Science (4) Electives: Suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech. **Option B: Biochemistry Emphasis** Chem 221, 221L Fund. Of Chem Concepts (4) Chem 222, 222L Fund. of Chem, Analysis (4) Chem 333 Intro Env Clin Forens Analysis (4) Chem 341,341L Organic Chem & Lab (5) Chem 342 342L Org. Chem & Lab II (5) Chem 466 Survey of Physical Chem (4) Chem 467 Surv of Physical Chem lab (2) BMB 301 Biochemistry Lecture (3) BMB 401 Biochem of Protein (3) BMB 403 Adv Biochemistry Lab (2) Math 146 Applied Calculus I (3) **Or** Math 165 Calculus I (4) Phys 211/212 College Physics (4,4) Biol 150, 150Lab Gen Biology I (4) Biol 151, 151Lab Gen Biology II (4) Earth Science (4) Electives: Suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech.	T&L 325 Exploring Teaching in Secondary Schools (3) T&L 345 Curriculum Development (3) T&L 350 Dev & Ed of Adolescent (3) T&L 386 Field Experience (Optional 1) T&L 390 School Lab Safety (1) T&L 400 Methods & Materials Science (3) T&L 433 Multicultural Ed (3) T&L 460 Micro Teaching (3) T&L 486 Field Experience (1) T&L 487 Senior Seminar (1) T&L 495 Independent Study (Optional 1) T&L 486 Student Teaching (16)
Total	**71 Total**	**34-36 Total**

Attachments:

1. Syllabi for chemistry courses required in the Chemistry major

Course	**Syllabus attachment**
Chem 341	CHEM341_syllabusF07.pdf
Chem 341L	Chem341L SyllabusF07.pdf
Chem 342	Syllabus,Chem342-07
Chem 342L	342L-07-sylabus
Chem 221	221Syll LS F'07.pdf
Chem 221L	Ch221L syll F07.pdf
Chem 222	Chem 222 syllabus-sp07.pdf
Chem 222L	CHEM 222L-Syllabus-2006.pdf
Chem 333	syllabus-detail 333 2006 with lab.pdf
Chem 461/L	Ch461 Syllabus Sp07.pdf; Ch461L Syllabus Sp07.pdf
Chem 462	Syll_Chem462-467 F07.pdf
Chem 464	Syll ch464 sp07.pdf
Chem 465	Chem-465-2007-Syllabus.pdf
Chem 466	Chem-466-Sylabus-updated.pdf
Chem 467	Syll_Chem462-467 F07.pdf
BMB 301	BMB301 sp06 syllabus.pdf

2. Student work samples

Standard	Topic	attached samples
13020.1 CHEMISTRY	1. Systematic and quantitative fundamentals of chemistry	*Ch221L exp 7.1.pdf* *Ch221L exp 7.2.pdf* *Ch222FinalSp07.good.pdf* *Ch222FinalSp07.poor.pdf* *Ch 341 E2 F07a.pdf* *Ch 341 E2 F07b.pdf*
13020.1 CHEMISTRY	2. Interaction of chemistry and technology and the associated ethical, environmental and human implications	*Ch221L exp 7.1.pdf* *Ch221L exp 7.2.pdf* *Ch342 Quiz 1B.pdf* *Ch342 Quiz 1F.pdf* *Ch342 Ex4A.pdf* *Ch342 Ex4D.pdf*
13020.1 CHEMISTRY	4. Study of mathematics through calculus (minimum of one semester of calculus) and statistics,	*lab_6_333.xls.pdf* *lab_6_333.xls2.pdf* *lab_6_333.pdf* *lab_5.xls.pdf* *LAB_5.pdf*
13020.2 NATURE OF SCIENCE	Study of the history and philosophy of science as well as the interrelationships among the sciences.	*Ch342LSp05Final.good.pdf* *Ch342LSp05Final.poor.pdf* *Chem342L Aspirin.pdf* *Chem342L Friedel_Crafts.pdf*
13020.3	Study of the processes of	*Chem342L Friedel_Crafts.pdf*

INQUIRY	science common to all scientific fields.	*lab_6_333.xls.pdf* *lab_6_333.xls2.pdf* *lab_6_333.pdf* *lab_5.xls.pdf* *LAB_5.pdf*
13020.4 CONTEXT OF SCIENCE	Study of the effect of social and technological context on the study of science and on the application and valuing of scientific knowledge.	*lab_6_333.xls.pdf* *lab_6_333.xls2.pdf* *lab_6_333.pdf* *lab_5.xls.pdf* *LAB_5.pdf*
13020.10 TECHNOLOGY	Study of current, appropriate instructional technologies.	*Ch 341Q1 F07a.pdf* *Ch 341Q1 F07b.pdf* *lab_5.xls.pdf* *LAB*_5.pdf
	Chemistry Undergraduate Assessment Plan	*Undergrad assess plan F05.pdf*