3+2 Chemistry and Packaging Consortium Agreement
Between
Michigan State University
and
North Carolina Central University

1. Preamble

This consortium agreement establishes a cooperative relationship between Michigan State University (MSU) and North Carolina Central University (NCCU) to benefit students who desire to earn a bachelor of science (BS) in chemistry and a Plan A Thesis-based Master's (MS) in packaging. This initiative stems from the Alliance for Graduate Education and the Professoriate (AGEP), an NSF program that supports recruitment, retention, and graduation of students in STEM (science, technology, engineering, and mathematics oriented) graduate programs developed between faculty and administrators at MSU and other institutions. This partnership aims to broaden participation in the packaging profession and to strengthen the pipeline for chemistry minded students to participate in advanced study and research based graduate programs, particularly in packaging.

2. General purposes

This agreement supports a 3+2 program in which students complete 95 credits at NCCU before enrolling at MSU for at least an additional 30 credits to earn an MS (Plan A) in Packaging. NCCU awards the BS in Chemistry and MSU confers the MS in Packaging.

3. Specific Activities and Implementation Plans

3.1. Recruitment of NCCU students

The MSU School of Packaging's graduate program director and undergraduate advisor will collaborate to recruit students by preparing promotion materials, responding to inquiries, and potentially visiting NCCU.

3.2. Advising students at NCCU

Designated MSU School of Packaging faculty and/or the graduate program director, along with NCCU academic advisors, will guide students on course selection to ensure timely progress toward both degrees.

3.3. Advising students at MSU

While students are at MSU, the undergraduate advisor and graduate program director will jointly advise on course selection, grad plan auditing, overrides, summer enrollment, and career networking and placement.

3.4. Cross-Institutional Communication

MSU and NCCU advisors share responsibility for addressing any academic challenges (e.g., dropped classes, medical withdrawal, poor grades) encountered by students during undergraduate study at MSU. MSU advisors will keep NCCU advisors informed of student progress and ensure NCCU is involved in any interventions.

4. University Units Involved

This agreement involves the following MSU units: the School of Packaging, the College of Agriculture and Natural Resources and the MSU Graduate School.

This agreement involves the following NCCU unit: the Department of Chemistry and Biochemistry.

5. Agreement Parameters

5.1. Degree Seeking Status

Students participating in this agreement shall enroll at MSU with undergraduate nondegree status and may apply up to 25 MSU credits (minimum 2.0 grade) towards the BS in Chemistry at NCCU. Upon conferral of the undergraduate degree from NCCU, MSU will reclassify students as graduate degree-seeking.

5.2. Admission to MSU

NCCU students are guaranteed admission to MSU provided:

1. Students should complete a 3 + 2 application during their Summer Research Opportunities Program (SROP) or by the end of the summer before they start at MSU. Once a student is accepted to the 3 + 2 Program they will then submit an admission non-degree application for the lifelong program to MSU. Student is coded to the Lifelong Non-Degree program and coded LIFEL_NOLU through the Registrar's Office.
2. Upon matriculation, the School of Packaging updates the student plan from LIFEL_NOLU to PACKA_NOLU. The School of Packaging also alerts feeclass@msu.edu that 3 + 2 students should be in-state for tuition purposes for NON career.
3. Once the student completes their 120th credit and is eligible for graduation from NCCU, they will then submit a graduate level admissions application for the Packaging master's program at MSU. The student must have a 3.0 or higher grade-point average on a 4.0-point scale.

5.3. Completion of the NCCU BS in Chemistry

Students can expect to graduate with a BS degree from NCCU provided:

a. They complete the required coursework as described in Addendum 1.
b. A 2.0 or higher grade is earned in each MSU class, allowing credits to transfer to NCCU.

If, for any reason, an NCCU 3+2 student withdraws from MSU prior to completion of the 120 credits required for the BS degree (Addendum 1), the student may return to NCCU to complete the BS degree by fulfilling credit, course work, and other requirements.

5.4. Completion of the MSU MS in Packaging

Students can expect to graduate with an MS (Plan A) in Packaging from MSU provided they complete the requirements found in the MSU Academic Programs and described in Addenda 1 and 2. In general, this entails securing an advisor and completing 30 credits of graduate-level coursework required for the degree, with at least half of those credits at the 800-level or above.

Students covered in this agreement may apply more than nine credits of graduate-level coursework (typically 400- or 800-level) completed while in nondegree status at MSU toward the MS in Packaging. The standard nine credit limit for credits earned through MSU's Lifelong Education program does not apply to students enrolled under this agreement.

Once enrolled in the MS program at MSU, progress through the degree will be governed by the policies and academic regulations for all MS students as detailed in the School of Packaging's Graduate Handbook (PKG Graduate Handbook). Although the curriculum outlined in Addendum 2 can be completed in a single academic year, there is no specific requirement that students follow this timetable.

Additionally, students may share more than nine, but no more than 17, graduate-level (typically 400- or 800-level) credits between their undergraduate and graduate degrees. This exceeds the standard maximum permitted under MSU's Shared Programs policy and represents a specific exception for students in this agreement.

5.5. Attachments and General Provisions

Addendum One: Curriculum and Requirements for BS in Chemistry from North Carolina Central University, Course options from MS Packaging program.

Addendum Two: Curriculum and Requirements for MS Packaging from Michigan State University.

Recognizing changes in curricula and course content are inevitable, each institution agrees to discuss with the other institution all curriculum changes affecting this agreement before changes are implemented.

This document, including its addenda, constitutes the entire agreement between the parties, and all prior discussions, agreements, and understandings, whether verbal or in writing, are merged in this document. Furthermore, the agreement is not considered to be a contract creating legal and financial relationships between the parties. The agreement is designed, rather, to facilitate and develop a genuine and mutually beneficial relationship.

6. Funding Arrangements

6.1. Financial Aid

While pursuing their undergraduate degree, NCCU will be considered the home school. As the host school, MSU's Office of Financial Aid (OFA) will notify the NCCU Office of Scholarships and Student Aid (OSSA) how many credits each student is taking each term, what the associated cost of attendance is for that coursework, and what, if any, financial assistance is being provided by MSU. NCCU is responsible for delivering any federal aid for which the student is eligible and reporting a student's enrollment information to the National Student Loan Data System (NSLDS).

Once a student has earned their bachelor's degree from NCCU and is fully admitted to the graduate program at MSU, aid administration and enrollment reporting will be done by MSU.

As a first-year student in the 3 + 2 Program, students have access to MSU fellowship funding options. Once admitted to the MS graduate program, students then have access to MSU graduate assistantship opportunities.

6.2. Tuition Status

Students will be classified as in-state, undergraduate students (undergraduate lifelong education rate) for tuition purposes until their undergraduate degree is conferred by NCCU. Upon conferral of the undergraduate degree from NCCU, students will be classified as in-state graduate students for tuition purposes.

7. Duration of the agreement

This agreement shall become effective as of the last date of signatures of both parties and shall remain in effect for three years following that date.

8. Termination

The agreement may be terminated by either party with a minimum of 120 days written notice. Should a decision be made to modify or dissolve this agreement, students who are already attending MSU at the time will be permitted to continue as long as their academic performance remains in good standing.

9. Review and Evaluation

A review of this agreement and the resulting programs will take place every five years by the representatives from both institutions. The MSU School of Packaging Graduate Committee and Curriculum Committee will be responsible for carrying out this evaluation for MSU School of Packaging.

10. Nondiscrimination

Both parties subscribe to a policy of equal opportunity and do not discriminate on the basis of race, color, gender, age, height, weight, marital or familial status, ethnicity, religion, national origin, or disability.

11. Communication between the parties

Official communication between parties should take place via email, with informal communication via phone.

MSU School of Packaging Contacts:
Interim Director, Laura Bix, bix@msu.edu, 517-355-4556
Graduate Program Director, Amy Radford-Popp, radforda@msu.edu, 517-243-5129
Undergraduate Advisor, Aaron Tucker, tucker68@msu.edu,
517-355-9580

NCCU Department of Chemistry & Biochemistry Contacts:
Professor & Chair, Abdul K. Mohammed, Ph.D., amohammed@nccu.edu, 919-530-6351
Professor & Graduate Coordinator, Fei Yan, Ph.D., fyan@nccu.edu, 919-530-7518

North Carolina Central University

E-SIGNED by Ontario Wooden
on 2025-11-25 14:52:16 EST

Ontario Wooden, Ph.D.
Provost & Vice Chancellor for Academic Affairs

E-SIGNED by Karen Keaton Jackson
on 2025-11-25 14:55:21 EST

Karen Keaton Jackson, Ph.D.
Interim Associate Provost for Acad. Programs
and Undergrad Research

E-SIGNED by Mohammad Ahmed
on 2025-12-18 09:41:24 EST

Mohammad W. Ahmed, Ph.D.
Dean, College of Health and Sciences

E-SIGNED by Abdul K. Mohammed
on 2025-12-18 11:34:18 EST

Abdul K. Mohammed, Ph.D.
Professor & Chair, Department of Chemistry & Biochemistry

.

Michigan State University

E-SIGNED by Laura Lee McIntyre
on 2026-01-13 10:02:30 EST

Laura Lee McIntyre, Ph.D.
Provost & Executive Vice President for Academic Affairs

E-SIGNED by Matthew Daum
on 2026-01-06 11:17:23 EST

Matt Daum , Ph.D
Dean, College of Agriculture and Natural Resources

E-SIGNED by Pero Dagbovie
on 2026-01-08 14:19:42 EST

Pero Dagbovie, Ph.D
Vice Provost for Graduate and Postdoctoral Studies & Dean
of the Graduate School

E-SIGNED by Laura Bix
on 2026-01-05 11:22:52 EST

Laura Bix , Ph.D.
Interim Director and Professor, School of Packaging

E-SIGNED by Anthony Krolak
on 2026-01-08 16:13:38 EST

Anthony Krolak, Associate Director
Office of Financial Aid

E-SIGNED by Lynn Kriser
on 2026-01-08 16:54:37 EST

Lynn Kriser
Office of General Counsel

12. Addendum One: Curriculum and Requirements for B.S. in Chemistry

Years 1-3 at NCCU (Plus Year 4 course options for MS plan A –Thesis)
Three-Year Curriculum Plan in: BACHELOR OF SCIENCE DEGREE IN CHEMISTRY, ACS CERTIFIED

Freshman Year (NCCU)		**Fall**			**Spring**			
Course Prefix/Number		**Course Title**	**Credit**		**Course Prefix/Number**		**Course Title**	**Credit**
*CHEM	1100	Gen. Chem. I	**4**		+CHEM	1200	Gen. Chem. II	**4**
*=MATH	2010	Calc & Anal Geom. I	**4**		*=MATH	2020	Calc & Anal Geom. II	**4**
*ENG	1110	English Composition I	**3**		*ENG	1210	English Composition II	**3**
*UNIV	1100	First year seminar	**2**		=PHYS	2305	Gen. Phys. For Sci & Eng I	**3**
*PEDU	1541	Fitness	**2**		=PHYS	2410	Lab I	**1**
*HEDU	1531	Health	**2**					
Total			**17**		**Total**			**15**

Sophomore Year (NCCU)		**Fall**			**Spring**			
Course Prefix/Number		**Course Title**	**Credit**		**Course Prefix/Number**		**Course Title**	**Credit**
+CHEM	3100	Org. Chem. I	**3**		+CHEM	3120	Org. Chem. II	**3**
+CHEM	3330	Org. Chem. Lab I	**1**		+CHEM	3340	Org. Chem. Lab. II	**1**
+CHEM	2020	Quant. Analysis	**4**		+CHEM	4400	Instrumental Analysis	**4**
=PHYS	2310	Gen. Phys.II	**3**		*HIST	1320	World Societies	**3**
=PHYS	2420	Lab I or II	**1**		*MFL II		Modern Foreign Language II	**3**
+CHEM	3200	Inorganic Chemistry	**4**		*MSCM	1250	Elem. Of Speech (SI)	**3**
Total			**16**		**Total**			**17**

Junior Year (NCCU)		**Fall**			**Spring**			
Course Prefix/Number		**Course Title**	**Credit**		**Course Prefix/Number**		**Course Title**	**Credit**
+CHEM	4010	Phys. Chem. I	**4**		+CHEM	4020	Phys. Chem. II	**4**
+CHEM	4900	Applied Math	**2**		*HUM	2410 or2420	**Arts & Humanities I or II**	**3**
#		General Elective	**3**		&CHEM		Advanced Elective	**3**
*BIOL	1202	Prin of Biol. Molecules and cells	**4**		+CHEM	4800 (WI)	Chem. Res. Literature	**3**
CHEM	4500	Biochemistry I	**3**		*SOSC		GEC Requirement	**3**
CHEM	4520	Biochemistry I Lab	**1**					
Total			**17**		**Total**			**16**

Year 4		**Fall (MSU)**			**Spring/Summer (MSU)**			
Course Prefix/Number		**Course Title**	**Credit**		**Course Prefix/Number**		**Course Title**	**Credit**
PKG	801	Packaging Materials	4		PKG	455	Food Packaging	4
PKG	810	PKG Professional Seminar	3		PKG	805	Advanced Packaging Dynamics	3

STT	464	Statistics for Biologists	3		PKG	804	Packaging Processes	2
PKG	410	Distribution PKG Dynamics	4		PKG	411	PKG Development Technology	3
					*PKG	493	Professional Internship in PKG (summer 202X)	3
Identify the guidance and mentoring committee, Meet with the committee by the end of the term					*Based on corporate sponsor availability*			
Total credits			14		Total credits (spring + summer)			12 + 3

BS in Chemistry awarded from NCCU
Courses to be transferred from MSU and their Equivalents at NCCU

MSU course to be transferred*		**NCCU course equivalent**		
PKG 801 Packaging Materials	4	Intro to Research (2c) & CHEM UG Sem (2c)	4	Senior Year
PKG 810 Packaging Professional Seminar	3	CHEM/BIOL Electives	3	Senior Year
STT 464 Statistics for Biologists	3	Applied MATH (CHEM 4900)	2	Senior Year
PKG 410 Distribution PKG Dynamics	4	Physics II (3c) + Physics II lab (1c) equivalent	4	Senior Year
PKG 455 Food Packaging	4	Advanced CHEM Elective	3	Senior Year
PKG 411 PKG Development Technology	3	CHEM/BIOL Electives	3	Senior Year
PKG 805 Advanced Packaging Dynamics	3	Advanced CHEM Elective	3	Senior Year
PKG 804 Packaging Processes	2	Advanced CHEM Elective	3	Senior Year
Total	26 cr		25 cr	

**This table will be modified and approved (prior to the start at MSU) through the NCCU Chemistry Department Chair and MSU SOP Graduate Program Director based on the individual student course requirements that are needed for graduation.*

Advising: During semester 7 the student works with The School of Packaging Graduate Program Director to develop a course of study, guidance committee (for Option A Thesis) and mentoring plan for the MS program
Status End of semester 8/first year as a graduate student at MSU: Students will have completed 120 credits.

13. Addendum Two: Curriculum and Requirements for MS (Plan A) in Packaging

Students will earn an MS (Plan A - Thesis) degree in Packaging from MSU provided they complete the requirements described in this Addendum and Academic Programs. These include completing 15 credits in packaging courses at the 400-level or higher, while ensuring that at least half of the 30 total credits required for the degree are at the 800-level or above.

The exact list of courses for each student will be determined by the student together with their guidance committee (2 packaging faculty members (one of which is their faculty advisor) plus 1 outside of packaging faculty member). The student's faculty advisor will be determined by the end of their first year at MSU. Listed below are example schedules.

Students will have the option of changing the composition of their guidance committee once they are enrolled in the MS program. To progress through the MS degree, students must adhere to the policies and academic regulations for all Packaging Plan A MS students as detailed in the School of Packaging Graduate Handbook.

Most importantly, although the curriculum outlined below can be completed in a single academic year, there is no specific requirement that students follow this timetable.

Some examples to follow demonstrating Year 2 options:

Example 1: Packaging Design interest

Graduate Year (MSU)		**Fall**			**Spring/Summer**			
Course Prefix/Number		**Course Title/Actions**	**Credit**		**Course Prefix/Number**		**Course Title/Actions**	**Credit**
Pkg	452 or 430	Medical PKG or PKG for Fast-Moving Consumer Goods	3-4		Pkg	421	Virtual Design and Prototyping	3
Pkg	825	Polymeric PKG Materials	4		Pkg	470 or 880	Packaging Sustainability or Life Cycle Assessment: Background, Principles, Calculations, and Applications	3
Pkg	899	Master's Thesis Research	3		Pkg	899	Master's Thesis Research	3
Total		***Meet with committee as a follow-up for recommendations***	**10-11**		**Total**		***Defend thesis by end of semester***	**9**

Example 2: Packaging Sustainability interest

Graduate Year (MSU)		**Fall**			**Spring/Summer**			
Course Prefix/Number		**Course Title/ Actions**	**Credit**		**Course Prefix/Number**		**Course Title/ Actions**	**Credit**
Pkg	875, 891, or 421	Stability and Recyclability of PKG Materials; PKG Selected Topics; or Virtual Design and Prototyping	3		Pkg	470	Pkg Sustainability	3
Pkg	899	Master's Thesis Research	3		Pkg	880, 815 or 480	Life Cycle Assessment: Background, Principles, Calculations, and Applications; Permeability and Shelf Life; or Packaging Laws and Regulations	3
Pkg	825	Polymeric PKG Materials	4		Pkg	899	Master's Thesis Research	3
Total		***Meet with committee as a follow-up for recommendations***	**10**		**Total**		***Defend thesis by end of semester***	**9**

Example 3: Food Packaging interest

Graduate Year (MSU)		**Fall**			**Spring/Summer**			
Course Prefix/Number		**Course Title**	**Credit**		**Course Prefix/Number**		**Course Title**	**Credit**
Pkg	825	Polymeric PKG Materials	4		Pkg	470, 480 or 880	Pkg Sustainability; Packaging Laws and Regulations; or Life Cycle Assessment:	3

							Background, Principles, Calculations, and Applications	
Pkg	899	Master's Thesis Research	3		Pkg	421 or 4xx	Virtual Design and Prototyping	3
Pkg	421, 456, or 465	Virtual Design and Prototyping; PKG & Shelf Life of Perishable Food; or PKG Value Chain	3		Pkg	899	Master's Thesis Research	3
Total		***Meet with committee as a follow-up for recommendations***	**10**		**Total**		***Defend thesis by end of semester***	**9**

14. MSU Course Descriptions for Courses that may be Transferred to NCCU

PKG 411 Package Development Technology (3cr)
Description: Development of consumer packaging utilizing current technology tools. Integration of package structure, graphics and performance. Examination and application of current practices in packaging development.
PKG 455 Food Packaging (4 cr)
Description: Food package systems and their relationship to specific products and processes. Product composition, deterioration and packaging-solutions. Shelf life, packaging, and supply chain issues
STT 464 Statistics for Biologists (3 cr)
Description: Biological random variables. Estimation of population parameters. Testing hypotheses. Linear correlation and regression. Analyses of counted and measured data to compare several biological groups including contingency tables and analysis of variance.
PKG 801 Packaging Materials (4 cr)
Description: Physical and chemical properties of packaging materials; design, manufacture, performance and evaluation of packages.
PKG 803 Packaging Distribution and Dynamics (2 cr)
Description: Transportation environment, distribution packaging design and testing.
(OR) PKG 410 Distribution Packaging Dynamics (4 cr)
Description: Identification and measurement of hazards in physical distribution. Methods of protection against climate, shock, vibration, and compression.
PKG 804 Packaging Processes (2 cr)
Description: Integrated study of packaging and production operations, quality control, organization and control of machines. Interrelationship of products, packaging, machinery layout and efficiency, and quality issues.
(OR) PKG 432 Packaging Processes (4 cr)
Description: Integrated study of packaging and production operations, quality control, and organization and control of machines. Interrelationship of products, packaging, machinery layout and efficiency, and quality issues.
PKG 805 Advanced Packaging Dynamics (3 cr)
Description: Shock and vibration. Distribution hazards and product fragility. Cushion performance and package design. Environmental measurement and simulation.
PKG 810 Packaging Professional Seminar (3 cr)
Description: Professional development, ethical conduct, leadership competency building, social responsibility and inclusive workplace strategies for academic and career success.

PKG 815 Permeability and Shelf Life (3 cr)

Description: Relationship between the storage life of packaged food and pharmaceutical products and the gas, moisture, and organic vapor permeability of packages in various environments.

PKG 825: Polymeric Packaging Materials (4 cr)

Description: Physical, mechanical and chemical properties of packaging polymers and multilayer structures; relationship between properties and performance of packaging materials and systems; processing of packaging plastics.

PKG 899 Master's Thesis Research (1-8 cr)

Description: Master's thesis research.