

# NC State Engineering Programs at UNC Asheville

# Student Handbook



**NC STATE UNIVERSITY**

A Collection of Information  
For Success  
5/2/11

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Please note the information contained in this student handbook is subject to change without notice and should be regarded as a guideline only. Students are subject to all UNC Asheville and NC State regulations and policies, and to the terms of all agreements between them. See your advisor if you have any questions.

## Welcome and Contact Information

Welcome to the NC State Engineering Programs at UNC Asheville! This handbook is intended to provide an easily accessible collection of the administrative information students need to navigate our programs. Please read it carefully, and keep it handy for reference as you make progress toward the completion of your degree.

Program faculty and staff take great pride in being available to students for help and guidance. If you can't find the information you need in this handbook, please don't hesitate to contact any of the faculty or staff, starting with:

NC State Engineering Programs Office – 303 Robinson Hall  
Phone: (828) 251-6640. Diane Morgan, [dmorgan@unca.edu](mailto:dmorgan@unca.edu)

Dr. Yusef Fahmy, Director  
311 Robinson Hall  
Phone: (828) 251-6944  
Email: [yfahmy@unca.edu](mailto:yfahmy@unca.edu)

Ms. Cheryl Alderman, Assoc. Dir.  
304 Robinson Hall  
Phone: (828) 251-6943  
Email: [calderma@unca.edu](mailto:calderma@unca.edu)

Dr. Rebecca Bruce, Assoc. Dir.  
220 Robinson Hall  
Phone: (828) 232-2275  
Email: [rbruce@unca.edu](mailto:rbruce@unca.edu)

A complete Directory of Program Faculty/Staff is available on the Program Website:  
[www.unca.edu/engineering](http://www.unca.edu/engineering)

## What Is Engineering?

According to ABET (the organization responsible for certifying the quality of engineering education in the United States), “Engineering is the profession in which knowledge of the mathematical and natural sciences, gained by study, experience, and practice, is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind.” The key words in this definition are “applied” and “develop.” Engineers are an essential part of the teams creating the real-world products and processes which shape the future. The term “engineering” also is used to describe the creative development activity performed by these teams.

The members of engineering teams, their activities, and their skills exist along a continuum of roles. Technicians work at the more concrete end of the continuum, closest to actual hardware and processes (think of a mechanic tuning cars, or a machinist fabricating parts). Scientists work at the more abstract end of the continuum, primarily concerned with discerning the laws of the universe and creating new knowledge. In between are engineers and engineering technologists, who are responsible for bridging the gap separating the scientists' abstract knowledge from the technicians' concrete products and processes. Engineering technologists work more closely with technicians, while engineers (also known as “engineering scientists” or “classical engineers”) work more closely with scientists.

In actual practice, the lines of activity and responsibility on engineering teams are nowhere near as clear-cut as implied in the paragraph above. All of these roles offer the prospect of interesting, meaningful, well-compensated careers.

## General Program Overview

Students at UNC Asheville can follow either of two paths to an NC State engineering degree:

- 1) The Bachelor of Science in Engineering (BSE) with Mechatronics Concentration (JEM) is a four year program combining aspects of mechanical, electrical, and computer engineering. Mechatronics students take all of their courses at UNC Asheville. Graduates receive a degree issued jointly by NC State and UNC Asheville. NC State began offering Asheville students the Bachelor of Science in Engineering with Mechatronics Concentration in 1999. Since 2009, the degree has been granted jointly by UNC Asheville and NC State. **Students are referred to Section 2 of this handbook for details on the Mechatronics or JEM degree.**
- 2) The Two-plus-Two Program (2+2) is for students pursuing degrees in other engineering disciplines (Aerospace, Civil, Mechanical, etc.). Two-plus-Two students spend their freshman and sophomore years at UNC Asheville, and then move to NC State in Raleigh for their junior and senior years. Some degree programs employ a 1+3 or 1.5+2.5 schedule. Students follow the degree requirements of the NCSU curriculum of their choice while enrolled at UNCA. Graduates receive a degree issued by NC State. UNC Asheville has offered a 2+2 program leading to NC State engineering degrees since 1988. **Students are referred to Section 3 of this handbook for details on the Two-plus-Two Program.**

Students following either path benefit from a unique combination of assets: the extensive resources of a major research university, with the intimate campus atmosphere and personal attention of a small liberal arts school; the rigorous, focused depth of an engineering curriculum, with the flexible, holistic breadth of an integrated liberal studies program; cutting edge technological education, in one of the nation's most desirable places to live.

## Section 1 Administrative Information for All Engineering Students

The joint nature of the NC State Engineering Programs at UNC Asheville sometimes poses challenges. The best strategy for minimizing problems is to avoid them by paying attention to the necessary procedures. Please note the important details listed below concerning enrollment in NC State engineering coursework at UNC Asheville:

1. You must be enrolled for your engineering coursework at both NCSU and UNCA. Engineering coursework includes all classes beginning with the departmental designators E, ECE, EGM, MAE, and MSE. If you have not enrolled for your engineering courses at both institutions, please contact the main program office *immediately*.
2. Engineering Online (EOL) courses are those which are broadcast to distance education (DE) sites around the state. Most originate on the main NCSU campus in Raleigh, though some are broadcast from other locations, including UNCA. EOL classes typically meet in Ramsey Library 011 (“Square D” studio), Robinson Hall 129 (“Steelcase” studio), or Robinson Hall 312 (Mechatronics studio). EOL coursework follows the NCSU academic calendar, which can be found at the ncsu.edu website. Please note the first day of classes at NCSU. You must start attending your EOL classes on the date that NCSU begins classes.
3. All academic actions regarding your NCSU classes (add, drop, etc.) must conform to NCSU deadlines. The last day to drop and the last day to add a course are in the NCSU calendar and there are ***NO EXCEPTIONS***. Any action you take with regard to an NCSU class must be accompanied by the same action at UNCA. Note: UNCA deadlines are typically different from those of NCSU. In every case, the earlier deadline applies.
4. Be certain to check both your NC State email account and your UNC Asheville email account *daily*. You will be receiving important information related to your coursework through these accounts. It is your responsibility to stay current on this information. It is recommended that you have all of your email forwarded to one preferred account.
5. Class attendance is mandatory, unless otherwise arranged with your instructor. Education is not simply the passive receipt of information from instructors by students, no matter how much the DE format may remind you of watching television. It is your responsibility to make an active contribution to your classes by participating fully in them.
6. Engineering is a rigorous profession. Please prepare yourself for the commitment and intensity it will take to be successful in your engineering coursework. You must be ready to spend the time and energy required to perform at the level expected of engineers. If you have any doubt that you are anything less than 100% ready to embark on your semester, consult your advisor *immediately*.
7. The NC State Course Web Sites can be found at <http://engineeringonline.ncsu.edu/onlinecourses/index.htm>

## **How to be a successful DE student:**

An important aspect of our engineering courses is that many of them are provided to us by Distance Education (DE) technology by NC State, College of Engineering, EngineeringOnline (EOL). Engineering courses at UNC Asheville are typically offered in live, interactive connections with a concurrent section at NC State. Other classes are offered on a delayed basis, and some are offered as traditional live classes at UNC Asheville.

1. Come to class always, regardless of the delivery mode. Attendance is the highest single indicator of the likelihood of your success. Attendance is checked every class period and sent to your professor.
2. Realize that DE classes from NCSU follow all rules / regulations of NCSU including registration, drop dates, exam dates, etc. Enrollment is also required through UNCA, and any changes must be processed by both universities.
3. Always check your NCSU email (or have it automatically forwarded to another regularly checked email address). Your NCSU professors will use your NCSU email address to tell you important messages.
4. Don't be shy to ask questions and interact with the remote class during lecture - they are glad to see / hear you. If you ask a question, remember to talk into the microphone. When possible, sit towards the front and center of the classroom so you will be in camera view and your professor in Raleigh can see you.
5. You are encouraged to interact with your professor outside of class even though he is in Raleigh. Usually you can post questions and concerns to the WolfWare discussion forum, or you can email the professor directly.
6. We scan your class materials to NCSU. Thus, when you submit homework, tests, or other assignments, be sure to use engineering paper (unless otherwise approved to use regular paper), write with a dark pen or pencil, write only on one side, don't write near the edges, number each page (e.g. 1/4, 2/4, 3/4, ...etc.), write your name on each page. See the next page for a complete discussion.
7. If you notice any technical problems with the incoming video or audio, please report the problem as soon as possible to either the facilitator or the studio staff person in the control room.
8. If teleconference office hours or review sessions are established for your class - be sure to attend even if you don't have a question. You will benefit from the extra materials and discussions.
9. If you have any questions about anything - be proactive and ask ahead of time and as early as possible. All problems are easier solved with more time and advance notice.

Also, remember that your Asheville facilitator is available to help you succeed in your classes. However, you must take responsibility for your own university education including reading the course materials, completing assignments on time, preparing for exams, abiding by the university rules, and coming to class.

## Format Requirements for Student Work

Most of your homework, tests, labs and projects will have to be scanned to NCSU for grading. The scanning process adds a few requirements to the format of work turned in. Please heed the following requirements. Failure to do so may result in delay or deducted points.

1. **Write legibly, darkly and large enough** (*at least 12 pt font size*).
2. Leave a **¼ inch BLANK margin** around all sides of each page.  
Scanners typically miss the outer ¼ inch.
3. Write on **one side of paper** only.
4. Use a **complete header**:  
First page: full name, Class ID, Assignment No., page number, date  
All other pages: Last name and page number (see next item)
5. **Number all pages** including top page, in the upper right corner of the page.  
Include both the page number and the total page count. Examples:  
1 of 7, 2 of 7, 3 of 7, ... 7 of 7      or      1/7, 2/7, 3/7, ... 7/7
6. **Use 8 ½ x 11 inch paper only.** Smaller notebook paper jams the scanner  
(...and jamming often results in crumpling and tearing).

Engineering paper (light grid on one side) is ideal. IEEE Student Chapter offers pads of engineering paper through our office, RH 303.

Remove spiral bound tear-out tatters completely (must still be 8 ½ x 11).

7. **Show all your work.** If you do not get full credit for a correct answer, then at least get maximum partial credit. The only way to do that is to show your work to demonstrate that you comprehend the solution technique.
8. **Use a paperclip instead of a staple.** Occasionally a stapled test will be given to you and the staple will be removed prior to scanning but this will make the pages stick together and not feed correctly.

## Inclement Weather Policies for Engineering Distance Education Classes

IF...	THEN...
<p>UNC Asheville is CLOSED Check <a href="http://www.unca.edu">www.unca.edu</a></p>	<p>All Classes are cancelled, including DE classes. Students should view archived lecture prior to next class meeting. Quizzes, HW, etc. are moved to next class meeting unless otherwise indicated</p>
<p>UNC Asheville is on LATE START Check <a href="http://www.unca.edu">www.unca.edu</a></p>	<p>DE class scheduled earlier than Start Time is cancelled. View archived lecture prior to next class meeting. Turn in homework on next regular class day by 2 p.m. For tests and quizzes, see your facilitator.</p> <p>DE classes scheduled after Start Time occur at regular time (unless NCSU is altered as well. Check <a href="http://www.ncsu.edu">www.ncsu.edu</a>).</p> <p>UNCA classes and local engineering classes meet on the delayed and shortened schedule of UNCA.</p> <p>Scheduling conflicts may arise – students should attend live classes and view archives if possible. Discuss conflicts with course facilitator or instructor.</p>
<p>NCSU is closed, but UNCA is open</p>	<p>DE Class is cancelled. Instructor will determine any adjustment to schedule.</p>
<p>NCSU on altered schedule Check <a href="http://www.ncsu.edu">www.ncsu.edu</a> UNCA is open</p>	<p>DE class is held or cancelled as per NCSU website posting. Instructor will determine any adjustment to schedule due to cancelled classes.</p>

Students are urged to use their judgment on travel during inclement weather.

Engineering classes which are local only (not received from NCSU) follow the UNCA schedule.

In the event of class cancelation, archived lecture will be made available to all enrolled students regardless of attendance history.

2/15/11

# Student IDs, Email Accounts, Computer Access and Passwords

When enrolled at UNCA and taking an engineering course, you will have the following:  
(Keep the information below in a secure place)

## 1. UNCA Student ID

You will be assigned a permanent 9-digit UNCA student ID. It should be on your OneCard.

930 - \_\_\_\_ - \_\_\_\_\_

## 2. UNCA E-mail Address

You will have an E-mail address as follows: \_\_\_\_\_@unca.edu.

It will have a maximum of 8 characters: first & middle initials plus 6 characters of last name (possibly a number at end). You will choose a password

## 3. NCSU Student ID

You will be assigned a permanent 9-digit NCSU student ID (not SS#).

001 - \_\_\_\_ - \_\_\_\_\_

## 4. NCSU Username – also called the Unity ID

You will be issued a UNITY ID which allows access to NCSU websites.

It will have a maximum of 8 characters (first & middle initials plus 6 characters of last name (possibly a number at end) \_\_\_\_\_

## 5. NCSU Email Address

The full address is xxxxxxx@ncsu.edu where xxxxxxx = Unity ID

Be sure to check both your UNCA and NCSU email accounts daily.

## 6. NCSU Default Password

Your initial (and permanent default) password will be 8 digits.

You should change this password upon first login.

Digits 1-4 of your password are the last four digits of your NCSU Student ID

Digits 5-6 are the birth month (01-12 for Jan-Dec); digits 7-8 are the birth day of (01-31)

\_\_\_\_ \_      \_\_\_\_ \_      \_\_\_\_ \_      \_\_\_\_ \_  
Last four numbers of NCSU ID      Birth Month      Birth Day

If you forget your ID or password, contact NCSU Programs Office, RBH 303/304, x6943. Passwords can be reset to this default.

## 7. Engineering Computer Lab User ID

You must request a user ID and password for the Engineering computing network (file space on our server here, and logon to Windows) from Engineering staff.

User Name: \_\_\_\_\_ (same as your NCSU Unity ID)

Password: \_\_\_\_\_ must be at least 8 digits

## **How to Forward Email to another account**

### **At UNCA:**

The student may cause the system to forward email sent to the Gmail account that UNCA has created (\_\_\_\_@unca.edu).

Here's how to forward messages automatically:

1. Sign in to Gmail.
2. Click [Settings](#) at the top of any Gmail page, and open the **Forwarding and POP/IMAP** tab.
3. Enter the email address to which you'd like your messages forwarded.
4. Select the action you'd like your messages to take from the drop-down menu. You can choose to keep Gmail's copy of the message in your inbox, or you can send it automatically to **All Mail** or **Trash**.
5. Click **Save Changes**

### **At NCSU:**

The student may request that NCSU forward email which is sent to the email account which NCSU has created (\_\_\_\_@ncsu.edu). The instructions for doing so are below:

1. Go to [sysnews.ncsu.edu](http://sysnews.ncsu.edu)
2. Login
3. Go to Email Tools USMOB – Email Forward Manager
4. Edit as desired.

For more information:

["http://itdapps.ncsu.edu/smdbwiki/index.php/USMDB:FAQ#Email\\_Forwards"](http://itdapps.ncsu.edu/smdbwiki/index.php/USMDB:FAQ#Email_Forwards).

It is recommended that you check your UNCA and NCSU email every day.

It is suggested that you forward your various email accounts to a single account of your choosing, and be sure to check it every day.

NCSU and NCSU faculty will contact you via your NCSU email.

UNCA and the Engineering Program will contact you via your UNCA email.

## Prerequisite and Corequisite List

Course	C-Wall	Prerequisite	Corequisite
CHEM 132	yes	MATH 167 or higher	3/10/11
CHEM 111	yes	-	CHEM 132
MATH 191	yes	High school algebra & trigonometry	-
MATH 192	yes	MATH 191 C- or better	-
MATH 291		MATH 192 C- or better	-
MATH 394	yes	MATH 291	-
PHYS 221	yes	MATH 191 C- or better	-
PHYS 222		MATH 192 C- or better PHYS 221 C- or better	-
STAT 225		MATH 192 C- or better	-
LANG 120	yes	-	
E 101		Freshman	-
ECE 109	yes	-	
ECE 200	yes	MATH 192 C- or better PHYS 221 C- or better	Cum GPA 2.5 or more Matriculation
ECE 209	yes	ECE 109 C- or better	-
ECE 211	yes	ECE 200 C- or better	ECE 220
ECE 212	yes	ECE 109 C- or better	-
ECE 220	yes	ECE 200 C- or better	-
ECE 301		ECE 211 C- or better ECE 220 C- or better	-
ECE 406		ECE 212 C- or better	-
ECE 455		MAE 435	-
ECE 460		ECE 301	-
EGM 180		-	-
EGM 360		EGM 180	-
EGM 482		EGM 360, senior	
MAE 206	yes	PHYS 221 C- or better MATH 192 C- or better	Cum GPA 2.5 or more Matriculation
MAE 208	yes	MAE 206 C- or better MATH 291	Cum GPA 2.5 or more
MAE 301	yes	MATH 291 PHYS 222	-
MAE 310		MAE 301 C- or better MATH 394 * C- or better	-
MAE 314	yes	MAE 206 C- or better MATH 291	MSE 201
MAE 315		MAE 208 C- or better MATH 394 * C- or better	
MAE 316		MAE 314 C- or better	
MAE 435		MATH 394 * C- or better MAE 315	-
MSE 201		CHEM 132 C- or better	-

\* JEM students MUST substitute ECE 220

## **C-Wall Courses**

Engineering courses which require a minimum passing grade of C- are called C-Wall (“see-wall”) courses.

For JEM students, the following courses are C-Wall courses:

CHEM 111	PHYS 221	ECE 109	MAE 206
CHEM 132	LANG 120	ECE 209	MAE 208
MATH 191	ECE 200	ECE 212	MAE 301
MATH 192	ECE 211	ECE 220	MAE 314

For 2+2 students, a generalized list of C-Wall courses follows. C-Wall courses are determined for each curriculum. 2+2 students should review specific NCSU departmental requirements.

CHEM 111	PHYS 221	ECE 109	MAE 206
CHEM 132	LANG 120	ECE 209	MAE 208
MATH 191	ECE 200	ECE 212	MAE 301
MATH 192	ECE 211	ECE 220	MAE 314
MATH 394	CSCI 201	CSCI 202	E 101

## **GPA and Registration Requirements for Engineering Students**

For registration in:

ECE 200: Intro to ECE Lab

Student must have a cumulative GPA of 2.500 or higher.

For registration in

ECE 211: Electric Circuits

ECE 212: Logic Design

ECE 220: Analytical Foundations of ECE

Students must meet transfer/matriculation requirements of:

Cumulative GPA of 2.500 or higher,

Average GPA of 2.500 in last two math classes taken

Must have completed with a grade of C- or better:

MATH 191, 192 and 291,

PHYS 221 and 222,

CHEM 132 and 111 and

LANG 101(3) and 102(3) or 120(4)

For registration in:

MAE 206: Engineering Statics

MAE 208: Engineering Dynamics

Student must have a cumulative UNCA GPA of 2.300 or higher to register.

## **Engineering Classes**

An engineering class offered at UNCA has the prefix E, ECE, EGM, MAE or MSE. For such classes, special registration and enrollment requirements exist.

## **Academic Calendar**

NC State and UNCA each have their own institutional academic calendar. These calendars often differ on start and end dates, breaks, final exams and enrollment deadlines.

For classes originating at NCSU, the NC State calendar is followed.

For classes originating at UNCA, the UNCA calendar is followed.

The NC State academic calendar can be found at <http://www.ncsu.edu/registrar/calendars/>

The UNCA academic calendar can be found at <http://registrar.unca.edu/academic-calendar>

An Engineering Start-Up calendar is typically provided to clarify start dates for each class, lab, etc.

## **Start and End Dates**

NC State classes begin and end on the NCSU academic calendar.

UNCA classes begin and end on the UNCA academic calendar.

Some local modifications are made, such as observance of UNCA Undergraduate Research. Course facilitators should provide necessary information.

## **Breaks**

Academic breaks may differ between NC State and UNCA, such as fall or spring break. Our site follows the break schedule of UNCA. Some modification of assignments or adjustment in lecture viewing may be necessary to remain on track. Course facilitators provide guidance as needed.

## **Final Exams**

NC State classes follow the NC State final exam schedule.

UNCA classes follow the UNCA final exam schedule.

In the event of a conflict, the student should bring this to the attention of the facilitator as soon as possible in the semester.

Students at UNCA may need to remain on campus after UNCA finals end to complete NC State finals. Accommodations for dorm residence should be arranged in advance through UNCA Residence Office.

## **Drop / Add Policies**

The first week of the semester is called the Add/Drop Period. Students may freely adjust their schedule as needed. At the end of this period, a student's schedule becomes fixed and all classes will appear on the academic transcript. Any enrollment changes in engineering classes must be made through both UNCA and NC State.

## **Class Withdrawal**

After the Add/Drop Period and until the Withdrawal Deadline, students may withdraw from a class. A grade of W will be assigned on the transcript. Engineering classes abide by the NC State withdrawal deadline. If a student withdraws from an engineering class through NC State, the student must also withdraw from the class through UNCA. Students may withdraw from one or more engineering courses with the assistance of the Engineering Adviser.

Withdrawals after the deadline are only considered for extenuating and unforeseeable reasons, and such withdrawal petitions to NC State must include all engineering classes in a given semester.

Documentation is typically required. No late withdrawal requests are accepted in the last two weeks of the semester.

### **Term Withdrawal**

At any time after the first day of the class, the withdrawal from all engineering courses in a semester is called Term Withdrawal at NC State. Once a request for Term Withdrawal has been processed, the student cannot add courses until the next semester.

If an unmatriculated student seeks to withdraw from all engineering courses in a semester, the student should see the Engineering Advisor.

If a matriculated Mechatronics student seeks to withdraw from all courses, the student should see the Engineering Advisor, but will also be required to contact the UNCA Counseling Center.

### **Grading Policies**

The Grading policies of NC State and UNCA differ.

NCSU uses a 13-point grading policy (F, D-, D, D+, C-, C, C+, B-, B, B+, A-, A, A+).

UNCA records engineering grades using an 11-point grading policy (F, D, D+, C-, C, C+, B-, B, B+, A-, A). Grades of D- are recorded as D; grades of A+ are recorded as A.

### **Grade Replacement Policies**

The Grade Replacement policies of NC State and UNCA differ.

UNCA allows the replacement of up to a maximum of 15 credits for courses in which a grade of C- or lower was earned. For courses repeated under this policy, the original grade is excluded from the UNCA GPA calculation. Students must submit a Course Repeat form to the OneStop Office prior to registration.

NC State allows the one time replacement of grades of D or lower with the following limitations:

- A maximum of 2 courses with a maximum of 8 credits.

- Repeated courses can be at the 100 or 200-level.

- Courses must have been taken initially within the first year of enrollment at NC State.

- The repeat enrollment must occur in the next regularly scheduled offering of the course.

For courses repeated under this policy, the original grade is excluded from the NC State GPA calculation. Students must submit a First Year Repeat form to NC State prior to the withdrawal deadline in the semester in which the course is repeated.

Engineering courses which are repeated may be handled or recorded differently by NC State and UNCA for the purposes of grade replacement and GPA calculation. Regardless, the graduation requirements of each institution must be met internally for JEM students.

### **Progress Toward Degree**

Students enrolled full-time are expected to demonstrate Progress Toward Degree Completion. As per university requirements, a minimum of 24 cr. should be completed each academic year. Student should have a degree plan on file with their adviser. If a student is not making satisfactory progress, the adviser will schedule a meeting.

## **Academic Standing**

Academic Standing at NCSU is based on a student's cumulative GPA at NCSU. Academic Standing at UNCA is based on a student's UNCA cumulative GPA. It is possible to be on suspension at NCSU, but not at UNCA. In such a case, a student is barred from engineering courses at UNCA until the NCSU suspension is lifted.

Good Standing        maintain a GPA of 2.000 or higher

Academic Warning    cumulative GPA less than 2.000, must see adviser for counseling, 14 cr. max

Academic Suspension    GPA threshold varies, at least one semester of suspension required

Return to University-UNCA: 14 cr. max, GPA for re-entry semester must meet requirements

Return to University-NCSU: While on Suspension, a student may enroll in up to two courses through NCSU Distance Education as a means of improving his/her GPS. Engineering courses are not allowed while on suspension.

## **Graduation Requirements on GPA**

UNCA requires the cumulative GPA to be 2.000 or higher. This includes any grade replacement as per UNCA policies.

NC State requires the cumulative GPA to be 2.000 or higher. This includes any grade replacement as per NC State policies.

NC State also requires the Major GPA to be 2.000. In the JEM curriculum, major courses are those with a prefix of ECE, EGM or MAE. C-Rule Exception: If all major courses were earned with grades of C- or higher, then the major GPA may be less than 2.000.

## How To Check your GPA

**How to Check your UNCA GPA** Go to [www.unca.edu](http://www.unca.edu) OnePort, log on  
Student Records  
Unofficial Academic Transcript .....and click SUBMIT to see your transcript.

**How to check your NCSU GPA** Go to [www.ncsu.edu](http://www.ncsu.edu) MyPackPortal, log on  
Academic Records, click on TRANSCRIPT.

## The Importance of Your MATH GPA

For 2+2s....  
at the time you both apply to NCSU and arrive at NCSU....

For JEMs...  
at the time you apply to matriculate (declare your major)....

The average of your last two math classes must be 2.500 or higher.

Courses which can be used in this calculation are:

MATH 191: Calculus I	4 cr.
MATH 192: Calculus II	4 cr.
MATH 291: Calculus III	4 cr.
ECE 220: Analytical Foundations of ECE	3 cr.

In addition, any 300-level or higher MATH class may be used.

Note: STAT 225 may NOT be used.

In general, you may not take 300-level or higher engineering courses unless you have matriculated.

## GPA Calculation Example

### Fall Semester - FRESHMAN

Course	Credits	Grade	Grade Value	Grade Points
CHEM 132	3	C	2.00	6.00
CHEM 111	1	A	4.00	4.00
E 101	1	A	4.00	4.00
LANG 120	4	C-	1.67	6.68
MATH 191	4	C+	2.33	9.32
LSIC 179	3	B	3.00	9.00
TOTALS	16	////////	////////	39.00

Term/Semester GPA 2.438

Cumulative GPA 2.438

### Spring Semester - FRESHMAN

Course	Credits	Grade	Grade Value	Grade Points
MATH 192	4	C	2.00	8.00
PHYS 221	4	B-	2.67	10.68
E 115	1 (S/U)	U	0.00	0.00
HP 123	1 (S/U)	S	-----	----
HUM 124	4	D	1.00	4.00
HWP 152	2	B+	3.33	6.66
TOTALS	16	////////	////////	29.34

Term/Semester GPA 1.956

Cumulative GPA 2.205

### Summer - Repeat Hum 124; pass with Grade A, exclude previous grade of D

Course	Credits	Grade	Grade Value	Grade Points
HUM 124	4	A	4.00	16.00
TOTALS	4	////////	////////	16.00

Term/Semester GPA 4.000

Cumulative GPA 2.592

### Fall Semester - SOPHOMORE

Course	Credits	Grade	Grade Value	Grade Points
ECE 109	3	A	4.00	12.00
ECE 200	4	B	3.00	12.00
MAE 206	3	C	2.00	6.00
MATH 291	4	B	3.00	12.00
PHYS 221	4	A-	3.67	14.68
TOTALS	18	////////	////////	56.68

Term/Semester GPA 3.149

Cumulative GPA 2.796

## Resources

Math Lab  
Robinson Hall, 3<sup>rd</sup> Floor

Writing Center,  
Karpen Hall, basement level

Physics Tutorial  
Inquire at Physics Office, Robinson 124

Counseling Center  
Weisenblatt Health Center, basement level

Career Centers and Career Fairs  
UNCA, Highsmith Union  
NC State website

IEEE and SAE Student Branches

Scholarships  
See our website

### **Computer Labs for Engineering Students      RH 305/312/137**

Mon – Thurs	8 a.m. – 8 p.m.
Fri	8 a.m. – 5 p.m.
Sat – Sun	2 p.m. – 6 p.m. (RH 305 only)

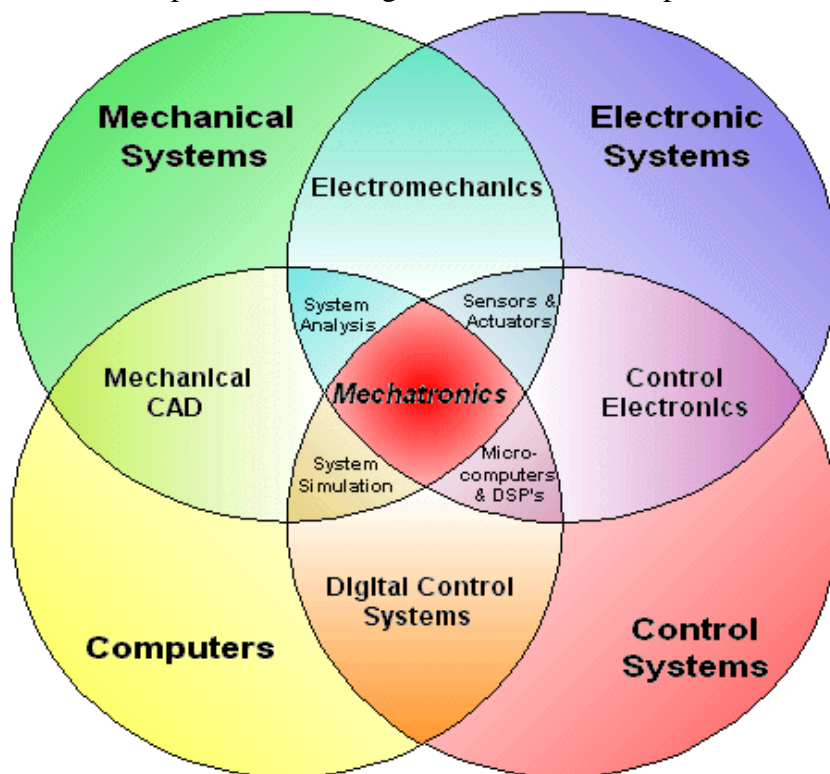
Computer labs will be closed on holidays and semester break days.

## Section 2 Bachelor of Science in Engineering – Mechatronics Concentration (JEM)

### What Is Mechatronics?

Mechatronics is a blend of mechanical engineering, electrical engineering, computer control and information technology. Mechatronics is a design process to create more functional and adaptable products. The word was first coined in Japan in the 1960s to refer to the synergistic blend of mechanics and electronics. But over the years mechatronics has come to mean a methodology for designing products that exhibit fast, precise performance. These characteristics can be achieved by considering not only the mechanical design, but also the use of servo controls, sensors, and electronics.

Mechatronics was first used in terms of the computer control of electric motors by an engineer at Japan's Yaskawa Electric Co. Many engineers contend that mechatronics grew out of robotics. Early robotic arms, then unable to coordinate their movements and without sensory feedback, benefited greatly from advances in kinematics, dynamics, controls, sensor technology, and high-level programming. During the 1970s, mechatronics was concerned with servo technology used in products such as automatic door openers, vending machines, and autofocus cameras. In the 1980s, as information technology was introduced, engineers began to embed microprocessors in mechanical systems to improve their performance. The 1990s saw the full arrival of the mechatronic age because of the increased use of computational intelligence in mechatronic products and systems.



## **Why Study Mechatronics?**

Mechatronics has been popular in Japan and continental Europe for several years, but has been slow to gain industrial and academic acceptance as a field of study and practice in Great Britain and the United States. In the past, machine and product design has been the domain of mechanical engineers. After the machine was designed by mechanical engineers, solutions to control and programming problems were added by software and computer engineers. This sequential engineering approach usually resulted in suboptimal designs.

The prime role of mechatronics is one of initiation and integration throughout the design process, with the mechatronics engineer as the leader. Experts in the interdisciplinary mechatronics field must acquire general knowledge of various techniques and be able to master the entire designing process. They must be able to use the specialized knowledge resources of other people and the particular blend of technologies that will provide the most economic, innovative, elegant, and appropriate solution to the problem at hand. Industry needs mechatronics engineers to continue to rapidly develop innovative products with performance, quality, and low cost.

## **Where Do Mechatronics Engineers Work?**

Mechatronic devices or “smart” devices have become common in our technologically advanced society. Examples of mechatronic devices include robots, anti-lock brakes, photocopiers, clothes dryers and computer disk drives. Mechatronic devices can be found in medicine and surgery, agriculture, buildings and homes, the toy and entertainment industry, intelligent aids for the elderly and disabled. Employment opportunities exist in manufacturing as well as in design, development, and research.

## **The Curriculum**

The Mechatronics curriculum combines the best that two nationally recognized universities have to offer. NC State provides the engineering component, comprising course work from the Departments of Electrical and Computer Engineering (ECE), Materials Science & Engineering (MSE), Mechanical and Aerospace Engineering (MAE), and Mechatronics (EGM). Hands-on labs are integral to the engineering course work. UNC Asheville provides an engineering-themed Humanities and Social Science component with a rich liberal arts foundation.

All students in the 2+2 Program take the same courses during their freshman year, except for one course which depends on the specific major being pursued. The sophomore year has some minor differences. Many of the requirements for NCSU engineering degrees parallel the requirements for UNC Asheville science majors, but vary when it comes to humanities and physical education standards. The universities also have different transfer credit policies.

## Joint Engineering Degree in Mechatronics Curriculum (JEM)

### FALL SEMESTER

### SPRING SEMESTER

#### Freshman Year

MATH 191	Calculus I	4		MATH 192	Calculus II	4
LANG 120	Fndns of Academic Writing	4		PHYS 221	Physics I	4
CHEM 132	General Chemistry	3		EGM 180	<i>Intro to Mechatronics Lab</i>	2
E 101	<i>Intro to Engr &amp; Prob Solving</i>	1		HUM 124	The Ancient World	4
CHEM 111	General Chemistry Lab	1		ECON 102	Microeconomics****	<u>3*</u>
[DEPT] 179	LSIC: Lib Studies Intro Colloq	<u>3<sup>a</sup></u>				17
		16				

#### Sophomore Year

MATH 291	Calculus III	4		ECE 209	Computer System Programm'g***	3
PHYS 222	Physics II	4		ECE 211	Electric Circuits	4
ECE 109	<i>Intro to Computer Systems**</i>	3		ECE 212	Fundamentals of Logic Design	3
ECE 200	<i>Intro to ECE Lab</i>	4		ECE 220	Analy Foundations of ECE	3
MAE 206	Engineering Statics	<u>3</u>		MAE 208	Engineering Dynamics	<u>3</u>
		18				16

#### Junior Year

MSE 201	Struc & Prop of Engr Matls	3		ECE 406	Design of Complex Digital Sys	3
MAE 301	<i>Engr Thermodynamics I</i>	3		MAE 314	Solid Mechanics	3
ECE 301	Linear Systems	4		MAE 435	Principles of Automatic Control	3
MAE 315	Dynamics of Machines	3		HUM 214	Rise of European Civilization	4
ARTS 310	Arts and Ideas	<u>3</u>		EGM 360	<i>Adv Mechatronics Design Lab</i>	<u>1</u>
		16				14

#### Senior Year

MAE 310	Heat Transfer Fundamentals	3		ECE 455	Computer Control of Robots	3
STAT 225	Intro to Calc-based Statistics	4		EGM 482	Senior Design Mechatronic Engr	4
ECE 460	Digital Systems Interfacing	3		MAE 316	Strength of Mech Components	3
HUM 324	The Modern World	4		DEPT 479	LSSC: Lib Studies Senior Colloq	<u>3<sup>c</sup></u>
HWP 152	Health and Fitness	<u>2<sup>b</sup></u>				13
		16				

Total hours shown: 126

Italics indicates NCSU Engineering course.

- a Students who transfer into the Mechatronics curriculum with 30+ credits will substitute [DEPT] 379 (3)
- b or HWP 153 (3), 154 (3), 155 (3) or EDUC 319 (3)
- c or HUM 414 (4)
- \* Cluster-specific section is an option. See Cluster 3 requirement CL3, Technology, Society and Culture.
- \*\* ECE 109 is typically offered in the Spring rather than the Fall, and is taken in the Freshman year.
- \*\*\* ECE 209 is typically offered in the Fall rather than the Spring, and is taken in the Sophomore year.
- \*\*\*\* ECON 102 can be moved to the Spring of the Sophomore year.

8/20/10

## **Mechatronics Program Educational Objectives**

The Mechatronics Engineering Program at UNC Asheville prepares engineers to achieve the following career/professional accomplishments:

1. Apply mechanical engineering and electrical engineering knowledge and skills to problems and challenges in the areas of mechatronic engineering.
2. Integrate and use systems or devices incorporating modern microelectronics, information technologies and modern engineering tools for product design, development and manufacturing.
3. Demonstrate professional interaction, communicate effectively with team members and work effectively on multi-disciplinary teams to achieve design and project objectives.
4. Engage in lifelong learning in their profession and practice professional and ethical responsibility.

### **To our students:**

These Program Educational Objectives (PEOs) form the core of our self-assessment and continuous improvement activities as we strive to provide the best possible engineering education in the JEM degree. ABET, the accrediting body for engineering degrees in the United States, judges our program based on these PEOs and the student outcomes that result. Successful mastery of engineering knowledge, student feedback and entry of our graduates into the engineering workforce are key components in this assessment. Copies of your tests and projects will likely be reviewed by ABET Evaluators at some time in the future. Revised and Approved July 1, 2006

## **Undergraduate Projects**

Senior Projects combine the design and fabrication process with fundamentals of mechanical engineering and electrical and computer engineering. Recent projects have included an autonomous 4-wheel drive 'Quad Rover', computer-controlled tracking solar energy systems, a mechatronic system that lifts and tilts a person in a wheelchair so s/he can receive medical attention without the risk of patient transfer, and a robotic fire-suppression vehicle. Designed and built from the ground up, these types of activities provide real-life, hands-on applications of an interdisciplinary engineering education that emphasizes teamwork skills. Mechatronics Engineering laboratory activities create a venue for a spectrum of design work. Line-following robots, fighting battle-bots, robots that self-navigate through uneven terrain and other automated systems are a few of the recent student projects. In the Mechatronics Program, there is hands-on design or lab activity in almost every semester.

## Internship Opportunities

Many students in the Mechatronics program have participated in internship employment at a number of local engineering companies including ArvinMeritor, Cane Creek Cycling, BorgWarner, and Eaton. These internships not only provide firsthand experience at the engineering practice, but in many instances have led to full-time jobs upon graduation. The UNC Asheville Career Center works closely with industry representatives to support listings of engineering jobs and internships and connect students to exciting work experiences.

## Employment and Professional Opportunities

Local, national, and international engineering companies such as Eaton, BorgWarner, and Cane Creek Cycling need students who have been a part of the unique and high-caliber engineering education that our Mechatronics program offers. Their strong support reflects the steady demand for our graduates. Approximately 90 percent of all the Mechatronics graduates are employed in challenging and exciting engineering positions in the Asheville area. Our program brings professional organizations such as the IEEE (Institute for Electrical and Electronic Engineers) and SAE (Society of Automotive Engineers) to the university through active student branches, meetings, and other networking opportunities.

## Matriculation - How to Declare a Mechatronics Major

If you satisfy the requirements below, you are eligible to declare a major in Mechatronics, also known as matriculation. The process has two parts:

- 1) Approval by NCSU College of Engineering, and
- 2) Major Declaration at UNCA

The process begins with a matriculation application - see your engineering advisor. Upon approval at NCSU, your UNCA Major Declaration form will be submitted.

### Matriculation Requirements for JEM:

1. Have completed the following courses  
(with a grade of C- or better):

CHEM 132, 111	E 101
EGM 180	LANG 120
MATH 191, 192	PHYS 221

2. Have a Cumulative UNCA GPA or 2.500 or better.
3. Have a Cumulative GPA of 2.500 or better in the last two math courses taken.  
(Note: if you have not achieved this GPA at the time you have completed MATH 291, then you may use ECE 220 as a math course to satisfy this requirement, or any other 300-level-or-above math course.)

## UNCA Policies on Transfer Credit which affect JEM Students

Permission to take a course at another institution is required for any transfer credit to UNCA.

No transfer credit is accepted in the last 30 credits of the degree (senior year).

No transfer credit from two-year colleges is allowed in the last 60 credits of the degree (junior and senior years). In other words, in junior year transfer credit is only accepted from four-year institutions.

## Notes on the UNCA Integrated Liberal Studies Requirements

### Topical Cluster

The JEM curriculum automatically satisfies

Cluster 15, Mechanical, Electrical and Optical Inventions: Science and Societal Impact with the courses ECE 109, MSE 201 and PHYS 221

The JEM curriculum satisfies

Cluster 3, Technology, Society and Culture with the courses MSE 201, CHEM 132 and ECON 102 (if taken with Dr. Leah Mathews)

### Intensives

The Intensives requirements of UNCA are satisfied with the following courses:

<u>Writing Intensive (3):</u>	EGM 180, EGM 482, LSIC 179/379
<u>Information Literacy Intensive (2):</u>	EGM 482, LANG 120
<u>Quantitative Intensive (1):</u>	MATH 192
<u>Diversity Intensive (1):</u>	ARTS 310 (must be designated DI)

## Foreign Language Proficiency

JEM students must satisfy the Foreign Language requirements of UNCA by demonstrating competency through the first year level or above. Possible avenues include

UNCA or college transferable credit for first year level foreign language

UNCA or college transferable credit for language above the first year level

Placement testing which places the student above the first year level.

College credit is not included in the JEM curriculum display because the requirement can be satisfied with proficiency.

## **Section 3 Two-plus-Two Engineering Program (2+2)**

The 2+2 Engineering Program allows students to complete the first two years of an engineering curriculum at UNC Asheville and finish their education in two more years at NC State in Raleigh. Students following certain 2+2 curricula must attend summer school at NC State between their sophomore and junior years in order to complete their degrees in four years.

Regardless of curriculum preference, all students in the 2+2 Engineering Program take the same courses during their freshman year, with the exception of one course. The sophomore year has some minor differences. Many of the requirements for NC State engineering parallel the requirements for UNC Asheville science majors but vary when it comes to humanities and physical education standards. The universities also have different transfer credit policies.

### **Degree Programs**

The Bachelor of Science in Engineering degree programs include the following:

- Aerospace Engineering
- Environmental Engineering
- Civil Engineering
- Industrial Engineering
- Construction Engineering & Management
- Mechanical Engineering
- Computer Engineering
- Nuclear Engineering
- Electrical Engineering
- Biomedical Engineering

These curricula are also supported, but must be completed on a 1 1/2+2 1/2 schedule:

- Biological & Agricultural Engineering
- Materials Engineering
- Chemical Engineering
- Textile Engineering

### **Engineering Courses**

Nine required sophomore-level NCSU engineering courses are offered at UNC Asheville. Some NCSU course work is taught by NCSU faculty residing on the UNC Asheville campus, while some is delivered to UNC Asheville via live distance education technology. All non-engineering coursework in both programs is taught by UNC Asheville faculty. In selecting their non-engineering coursework, 2+2 students follow the NCSU General Education Program (GEP) requirements of NC State.

### **Transfer Policies**

Ideally, students working toward an engineering degree should transfer when they have completed approximately the first half of the curriculum. Transfer admission standards vary with each degree program according to the space available and the number of applicants. Most require a minimum grade-

point average of 3.0. To transfer into an NCSU engineering curriculum (the process of matriculation), students must have completed 30 credits or more including the following courses (with a grade of C- or better):

- Chemistry—1 semester (CHEM 132 + 111)
- Calculus—2 semesters (MATH 191 + 192)
- English Composition—1 semester (4 cr.) (LANG 120)
- Calculus-based Physics—1 semester (PHYS 221)
- Humanities or Social Science—1 semester

Students must have a Cumulative GPA of 2.500 or better in the last two math courses taken at the time of transfer. (Note: if the student has not achieved this GPA at the time MATH 291 is completed, then ECE 220, or any other 300-level-or-above math course, may be used to satisfy this requirement.)

If NC State courses have been taken, a cumulative GPA of 2.0 or better is required at NC State.

If you satisfy these requirements or have them in progress, you are eligible to apply for transfer to the NC State College of Engineering. Please discuss this with your engineering advisor before beginning the application process. Transfer to begin at NC State for a Fall semester is ideal.

## **Cooperative Education**

NCSU's College of Engineering has an active Cooperative Education Program, enabling 2+2 students to alternate on-the-job experience with classroom learning and graduate with a co-op certificate after 12 months of work in a structured situation. Students can become eligible for the co-op program when they meet admission requirements for one of NCSU's engineering degree programs.

## **Scholarship Opportunities**

A variety of scholarships are available to 2+2 students. Please visit our Web site at [www.unca.edu/engineering/](http://www.unca.edu/engineering/) for more details.

## **Should you take LSIC Dept 179? (or LSIC Dept 379 for transfer students)**

The Liberal Studies Introductory Colloquium (LSIC) courses are designed to be interesting and engaging surveys of topics such as "Bad" Science Fiction, Engineering Design, and Astronomical Matter. Moreover, they are an excellent introduction to resources at UNCA and skills necessary to succeed in college. While as a 2+2 student at UNCA, you are not required to take LSIC Dept 179 (or LSIC Dept 379 for transfers) but it is highly recommended that you do so for two reasons: (1) LSIC courses are designed to promote your success at UNCA and (2) if you want to switch to Mechatronics, you are required to have it.

**UNCA Equivalent Courses, NC State College of Engineering**  
**Two-Plus-Two Engineering Program**

**GEP Requirements**

Humanities, Social Science, Visual & Performing Arts, and Interdisciplinary Perspectives  
 4/25/11 Effective for students entering Summer II, 2009 or after

A total of seven courses (21 credit hours) are required.

Underline indicates no prerequisite required. Numbers in Parentheses indicate credit other than (3).

All courses must be completed with regular grading (not S/U or pass/fail).

<b>REQUIREMENT</b>	<b>UNCA COURSES (3 cr.) which satisfy requirement</b>	<b>COURSE</b>
<b>Humanities</b> Two courses from different disciplines <i>Special major requirements in ME, AE and MSE</i>	LIT <u>241</u> , <u>246</u> , 324, 357 LIT 321, 322 (GK) HIST <u>101,102</u> , 305, 308, 311, <u>315</u> , 348 HIST <u>152</u> , 330, 362, 364, 367, 368 HIST <u>151</u> (GK) HUM(4) <u>124</u> (GK) PHIL <u>100</u> , <u>200</u> , 213, <u>250</u>	_____ _____ _____
<b>Social Science</b> Introductory Economics	ECON <u>102</u> Microeconomics	_____
<b>Social Science</b> One course <i>Special major requirements in ENE</i>	POLS(4) <u>220</u> , 321, 359 POLS(4) <u>281</u> (GK) PSYC <u>100</u> , 200 SOC <u>100</u> , <u>200</u> SOC <u>210</u> , <u>221</u> (USD) ANTH <u>100</u> (GK)	_____ _____
<b>Interdisciplinary Perspectives</b> Two courses <i>Special major requirements in BE, IE, IEF, AE, ME and MSE</i>	PHIL <u>307</u>	_____ _____
<b>Additional Breadth</b> One course from either Humanities, Social Science or Visual & Performing Arts	See Humanities and Social Science lists above ART <u>380</u>	_____
<b><i>The following requirements must also be satisfied:</i></b>		
<b>US Diversity (USD)</b> One course	SOC <u>210</u> , <u>221</u> (USD)	_____
<b>Global Knowledge (GK)</b> One course	LIT 321, 322 (GK) POLS(4) <u>281</u> (GK) HIST <u>151</u> (GK) ANTH <u>100</u> (GK) HUM(4) <u>124</u> (GK)	_____ _____
<b>Foreign Language</b> Competency at the NCSU 102 level is a graduation requirement.	Foreign Lang 110 + 120 <b><i>Other ways to satisfy this:</i></b> Community College: Foreign Lang 111 + 112 High School: 2 years with a C(77) or better average	_____ _____

## Physical Education Requirements for 2+2 Students

The NCSU requirement for Physical Education is:

PE 10*	Wellness and Fitness Elective	1 cr.
PE ***	Physical Education (activity)	<u>1 cr.</u>
	TOTAL	2 cr.

Below are various ways to satisfy the requirement.....

COURSE	Credit	NCSU Equivalent
<b><u>UNCA Route</u></b>		
HWP 152 (2 cr.) or HWP 153 (3 cr.)	2 or 3 cr.	PE 10*
Any HW activity class	1 cr.	PE ***
<b><u>Community College Route</u></b>		
PED 110	2 cr.	PE 10*
Any PED activity class	1 cr.	PE ***

## NCSU College of Engineering      2+2 Online Transfer Application Instructions

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### ***When to Apply?***

At the beginning of your last semester at UNCA (preferably a Spring semester).

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### ***How to Apply?***

Visit the websites below and follow instructions for online application

### **Application Form ....create an account on WolfPaw, fill it out, submit it, pay application fee**

Go to <http://admissions.ncsu.edu>

NCSU Admissions – go to “How Do I Apply?”, then Transfer Admissions

Be sure to use your SS# and to use the EXACT name you have on file at NCSU already.

### **Information on housing, parking, scholarships, tours, visits .... and more**

<http://www.engr.ncsu.edu/students/prospective.html>      NCSU College of Engr’g Transfer Admissions

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### ***Deadline to Apply?***

Deadline to apply is approximately 1 month before the end of your last semester at UNCA.  
For example, apply during spring semester for fall admission.

Check the website for the exact deadline, BUT.....

You are advised to submit your application as early in the semester as possible.

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### ***Transcripts?***

.... (This differs from what the Admissions website says)

UNCA Have your UNCA transcript(s) sent to:

Cheryl Alderman  
NCSU Engineering Progs. at UNCA  
UNCA    CPO# 2360  
One University Heights  
Asheville    NC 28804-8511

*Two copies are required:*  
*One at time of application*  
*One at end of current semester*

**All Others:**    Send to NCSU Admissions  
NCSU    Box 7103  
Raleigh    NC 27695-7103

*This includes:*  
*High School*  
*All Other Colleges Attended*  
*AP Score Report*

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### ***Admission Decision?***

You will hear directly from NCSU Undergraduate Admissions on the decision in your case.  
Be sure to promptly return the enrollment response card indicating your intent to enroll.    3/25/09

*Please note the information contained in this student handbook is subject to change without notice and should be regarded as a guideline only. Students are subject to all UNC Asheville and NC State regulations and policies, and to the terms of all agreements between them. See your advisor if you have any questions.*

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