



computer. aided. making _ digital fabrication facility _ interior architecture _ university of north carolina greensboro

OPERATIONS & FILE SUBMISSIONS

All terms, conditions, and pricing are subject to change in this operations/file submission document. All CAM students/users must be aware of the current operations/file submission processes for CAM before using the facility.

Lab Location

University of North Carolina at Greensboro
Department of Interior Architecture
Gatewood Studio Arts Building
527 Highland Avenue, Room 313
Greensboro, NC 27402

Digital Fabrication Director

Felicia F. Dean
Office_108_Gatewood Studio Arts Center
Email_ffdean@uncg.edu

Hours of Operation SPRING 2019

Monday –Tuesday, Thursday: 9am-5pm

Wednesday: 9am – 3pm

Friday 9am – 2pm

Closed for the Summer, weekends, when UNCG is closed or out of session, and as posted by door of room 313 (this includes all equipment and lab accessibility)

[CAM Brief](#)

CAM Users

CAM services are open to all IARc and Art student majors and faculty. Faculty will need to coordinate with the digital fabrication director a time and day in which students in his/her course attend CAM orientations for equipment as a group. The orientations include an overview of CAM Operations, and Presentations + Demos for Laser Cutting, 3D Printing, and Vinyl Cutting. Students/Faculty wishing to use the facility that are IARc or Art non-majors/non-faculty please contact the digital fabrication director with any inquiries.

CAM Assistants

The CAM assistants are responsible for promoting and operating the CAM equipment. The training of these individuals helps to ensure the equipment is properly running and maintained. The assistants are

there to help students with questions and concerns. It is NOT the responsibility of the assistant to “fix” any problems that may occur with students’ files for any of the digitally based equipment. CAM assistants have the authority to not run files if they foresee problems. They also have authority to ask students to not continue in actions that may be harmful or disruptive in CAM.

Machine Operation

No one other than the CAM assistants will operate the laser, CNC, 3D printers, vinyl cutter, or hot press. The 3D scanners are for IARc /Art student majors to use under the guidance of the CAM assistants. All mechanical issues the student/user encounters when operating the 3D scanners are required to be reported to the CAM assistant on duty. Failing to do so will result in loss of CAM privileges. A student/user should never try to fix the equipment when a mechanical problem arises.

Scope of Student/User Projects

Personal projects will not be processed in CAM. Only projects for courses students are currently enrolled in will be processed in CAM, based on the following criteria. The facility will not process work for academic projects, non-academic projects, or university projects that compete with industry/businesses. The IARc department does not compete with industry to process jobs/work orders for businesses or partnerships. Student internships and industry partnerships should provide the student(s) with the professional experience of how to partner with industry and manufacturers. CAM has the right to not process jobs if they do not fit within its operations. Please contact the Digital Fabrication Director if your project falls outside of this scope. They are assessed on a case-by-case basis.

Any IARc or Art faculty interested in integrating CAM fabrication into their class projects/or for department events must contact the digital fabrication director via email with FALL inquiries in during the first two weeks in April of the previous SPRING semester. Inquires for the SPRING must be received during the first two weeks in November of the previous FALL semester. The email should include a project statement, listed deliverables, and a description of CAM’s potential involvement. CAM provides the services of running files and equipment for student/faculty within the guidelines of the CAM operations. Also, CAM provides presentations for courses which gives students a general overview of the machine processes and capabilities.

CAM does not teach students how to make the type of file extensions required for processing work on the computer-aided equipment. Rather, the equipment is used as an extension of realizing physical work by providing the tools and services to run student/faculty created files from programs previously/currently investigated in coursework/research. CAM does advise on how files must be set-up based on the parameters of the computer-aided equipment. All CAM advising for each machine is available in this CAM Operations document listed under each piece of equipment’s ***Rules/ Precautions.***

Any IARc or Art faculty members who would like use CAM services for their scholarly research should contact the CAM director with any inquiries if they fall outside of the CAM Operations specifications.

Data

Students/users are responsible for their design's compatibility with the digital fabrication equipment. CAM is not responsible for printing/cutting complications due to file/design issues. Charges accrue on file issues when printing or cutting, and payment is the responsibility of the student/user.

It is the responsibility of each student/user to backup all of the data/files they submit to CAM. Periodically we clean off all the submitted files on the computers, so there is no guarantee we will have your file(s) on hand.

Student / User Supplied Materials

CAM will not print with user-supplied materials for the 3D printers. Also, the facility will not cut user-supplied materials for the vinyl cutter. Faculty should notify the digital fabrication director of course projects centered around 3D printing and vinyl cutting in the time frame listed in this document's **Scope of Student/User Projects**. In such cases, there will be an evaluation of how materials are supplied, whether as part of the student/user CAM costs or at another monetary rate when supplied by a course(s).

The department is not responsible for the replacement of student/user-supplied materials in the event of a machine error. The students/users take on the responsibility of having projects printed or cut at their own risk. Machines do malfunction. However, CAM will make every effort to avoid such situations.

Clean-up and Maintenance

All students/users are expected to clean-up materials and their trash after using the CAM space. This includes but is not limited to: trashing/recycling of any material remnants and cleaning of surfaces. Drinks and food are prohibited at all computer and equipment stations. Additionally, food should never be thrown in the CAM trashcan in room 313.

Storage

CAM does not have storage for users' projects or raw materials. Materials need to be stored until processed by the studio assistants; however, material or projects that are left in CAM longer than 24 hours take the risk of being thrown away or damaged.

Payment

Spartan Cash is the only form of payment accepted. You can load money onto your Spartan Card by calling their office, visiting their website, or by loading cash on your card at any of the stations on campus.

An estimate will also be given for vinyl cutting jobs. The final cost will be determined by the actual number of linear inches of the print job + setup fee(s).

The student/user will be responsible for paying for the final cost of their Laser Cutting and Vinyl Cutting,

immediately after their job is processed. Student/user payment for 3D printing, the Hot Press and CNCing are due before they are processed. Orders not paid for will be held until payment is received.

If a student is working on a project for a faculty member, the cost of the service is at the charge of the faculty member pricing.

All services rendered for departments will be coordinated with the Digital Fabrication Director.

Non-fulfillment of payment by students/users of CAM rendered services may lead to the loss of CAM privileges.

Turnaround Times

CAM will not guarantee turnaround times for projects, but will make every effort to process jobs as quickly as possible.

Quotes generated on CAM request forms by assistants will be filed and valid for six days. Quotes remaining on file will be purged after 6 days from their original creation. If a student/user quote has expired, they may obtain a new quote, but will need to resubmit their file(s).

Laser Cutter

Project Scheduling

Students/users may sign-up for no more than two time slots each week for the laser. Each block of time is 30 minutes. Sign-up sheets are posted outside of CAM, room 313, or available with the CAM assistant for same day sign-up. Students are welcome as walk-ins as long as no one is signed –up during the time slot. However, signing-up is the best way to guarantee cut time. If a student is not on time for the appointment, they will need to reschedule. Also, if late or unprepared the time slot may be assigned to a student walk-in. If there is not a walk-in waiting, it is at the discretion of the lab assistant whether there is enough time to run the file within the student’s original time slot. Students who have already signed up for two blocks of time in a week may gain additional time as a walk-in. Walk-in priority will be given to the prepared student who is there at the same time they are requesting. Walk-in appointments are only available during the laser operation hours in which no student/user has signed up for a time slot.

For group projects, students may sign up for a maximum of four time slots per week. In order to minimize project issues and confusion, at least one student in the group is required to be at CAM during the scheduled time of a group member. A student group that has maxed out their time for that week may gain additional time as a walk-in.

Cancel a time slot by notifying the CAM director no later than 8am on the day of the appointment. Continually missed, cancelled, or rescheduled appointments will result in loss of CAM privileges.

The sign-up sheet with laser operational hours is posted outside of Room 313 in the Gatewood Studio Arts building. The laser operational hours are different from CAM's general hours of operation.

Machine Approved Materials

Only the materials on the approved list may be cut on the laser. These include 1 ply cardboard, 2 ply cardboard, 1/8" acrylic (clear, with plastic film covering), 1/16" acrylic (clear, with plastic film covering), Bristol paper/cardstock 100 lb, 1 ply chipboard/ museum board, 2 ply chipboard/ museum board, and 1/8" baltic birch plywood. The cutting of other materials will be considered on a case-by-case basis. Please contact the digital fabrication director with any inquiries.

How to Submit a File

Students/users are to bring their files already loaded on the approved **AI or Rhino template** and on a jump drive to CAM during their scheduled time. Additionally, students must bring their material for cutting. The material should already be sized no larger than the maximum material size of the laser's bed [24" x 48"]. The student/user will fill out their portion of the laser request sheet and turn it in to the lab assistant with the material they have brought with them. Then their file will be transferred to the hard drive of CAM's computer. Once the file has been transferred, it is the student's/user's responsibility to not leave their jump drive at CAM. The student/user is required to stay at CAM while the work is being processed.

The template files, for both Adobe Illustrator and Rhino, are available on the IARc website under Resources-> CAM-> Support. Additional information on how to setup your file on the AI and Rhino templates can be found in this document. If a file is created improperly by the student/user, the job will be stopped and they will need to fix the file before it can be run again. Materials cut during this time are the responsibility of the student/user to replace. In the majority of cases, files not originally created in AI or Rhino tend to run into errors when laser cutting.

Rules/ Precautions

_Students/users should never walk into the laser operation designated area whether it is in operation or not.

_The student/user is required to stay the full duration of time it takes to run his/her laser project.

_The only materials that can be cut are only the ones listed on the "*Machine Approved Materials*" list.

_The student/user must provide flat and clean materials to be cut. Warped, bowed, and altered materials will not be cut.

_ In order to cut acrylic, students must present a valid receipt documenting the material type.

_Acrylic must be laser cut with the plastic film covering still attached and smooth, not altered. Acrylic with a protective paper covering will not be cut.

_The post processing to remove the protected film from the acrylic is to be completed by the student/user.

_The post processing to trim cardboard or 1/8" baltic birch out after it is cut is to be completed by the student/user.

_Text must be converted to outlines because it may not be part of the available fonts recognizable by our digital programs. For Illustrator files select text and go to Type -> Create Outlines, then change stroke color to the appropriate color for the desired laser cut.

_All files created and saved on the Illustrator Ai template must be saved as a CS6 Illustrator file. Files created on the template and saved as CC (Creative Cloud Illustrator) version will not open properly on the laser's computer.

_If a digital file is created improperly due to the student/user, the job will be stopped and the student/user will need to additional material for the recut of the job.

_If it is discovered in the digital preview that the object needs additional editing (ex: scaling the size, grouping, etc.), it is the student's/user's responsibility to correct the file and resubmit it for rescheduling at a later date/time.

_ When setting up a layout that includes line sharing (two outlines right next to each other so that they share a single cut line), please be sure to delete any redundant copies of lines. If you have lines stacked on top of each other, though you might not be able to see them in your file, the laser cutter will see the paths and end up cutting twice along the same line, degrading the final part and possibly causing melting, warping, or fire.

_Review the information below in **Files Designed in Ai Laser Cut Template** for additional information and precautions.

Files Designed in Ai Laser Cut Template

Cut Lines – All lines should be .01" in weight or stroke (hairline). All files should have only paths and stokes only with no fill colors. The only fill that should be on a file is black (raster). The laser cutter reads colors in order to print what you would like. Each color has a different action and listed in the layers toolbar. Your file should use the various RGB swatches that have been built into the template file to make sure that there are no color problems for the laser to read. Make sure that all lines are at 100% opacity. The RGB colors and action of those lines are as follows:

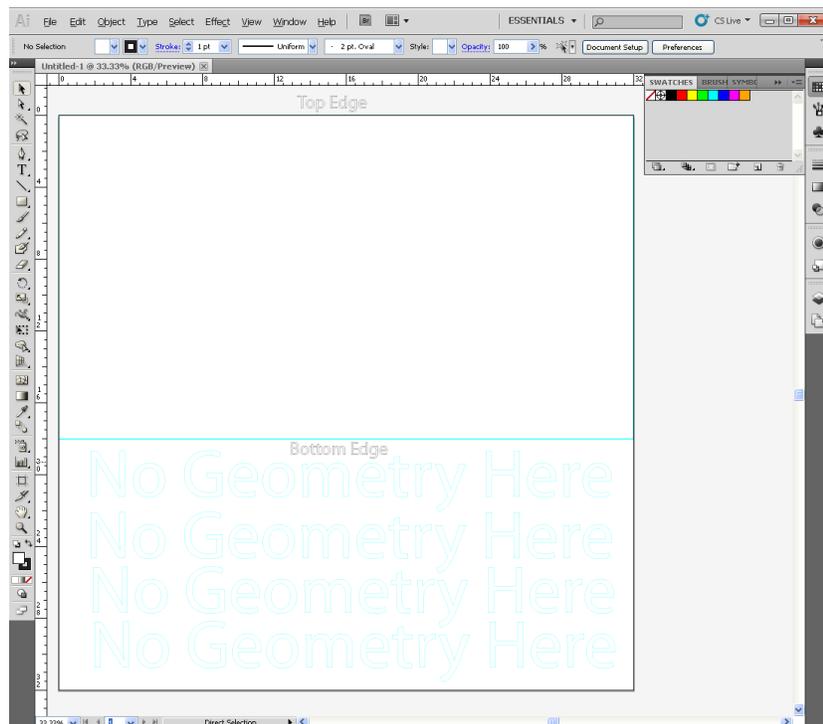
Outside cut lines – Magenta	Inside Cut lines – blue
Light engrave – red	Medium engrave – green
Deep engrave – yellow	Raster – black
Laser's Cutting Bed Size – Cyan	Material Size– Orange

Note:

1. If you do not use the exact RGB swatch colors your file will not cut
2. Black raster takes a long time = more money to print job on laser
3. Cyan – is used for page set up and outlines you may want for reference (i.e. 48"x24" laser bed).
4. If your lines weights are not .01" the file will read all raster lines = long time .
Additionally, if your line weights are not .01" the laser will not recognize the lines as cut lines.
5. The laser only cuts one line thickness. If you need a thicker line cut either draw two lines next to each other or choose to raster a rectangle (black fill)
6. Orange lines should be used to outline your material size (make sure all items you would like to cut/engrave/raster are inside that boundary).
7. All line work must be on the construction plane. No lines floating in space will be read by the laser printer.

Standard Layout Area – all files should be set up on a 48" w x 24" (cyan color) drawing file. Regardless of the actual size of your material (which is a good thing to first draw in Orange – so you can make sure your pieces fit).

All of your files should be set up in the upper left hand corner of the 48x24. This is your reference home (0,0) for the laser to orientate and reference your material and cut file.



Be sure to leave at least 0.125" between adjacent parts in your layout (for materials thicker than 1/4", adjacent parts should be no closer together than the material thickness)

Make sure that you are only drawing in the area that is designated for your work. The area that is marked "No Geometry Here" should not hold any of your work.

Below is a layout example:



Line sharing — When setting up a layout that includes line sharing (two parts right next to each other so that they share a single cut line), please be sure to delete any redundant copies of lines. If you have lines stacked on top of each other, though you might not be able to see them in your file, the laser cutter will see the paths and end up cutting twice along the same line, degrading the final part (and possibly causing melting, warping, or fire).

Sharp corners — If you have any sharp corners, you might consider rounding them (called "adding a radius" to a corner, or "adding a fillet") so your parts will be less likely to crack around the corners. We can certainly cut your parts with sharp corners if you prefer. This radius can be very small (i.e. .05")

Adjust for kerf — You may want to adjust for the kerf (the thickness of the laser beam), which is about 0.01". (The laser centers itself on the lines you draw and takes off about 0.005" of material from either side of the lines.) For example, if you would like the hole in your part to have a diameter of roughly 1.0", you should draw a hole with a diameter of 0.99". If you would like a circular part with a diameter of about 3.0", draw a circle with a 3.01" diameter.

Small details — should be no smaller than material thickness. For example, if you are cutting a spider web pattern from 1/4" acrylic, the thin pieces of plastic that make up the web must be no thinner than 1/4" wide in your drawings. Note that the laser beam thickness will cause the final piece to have webs that are slightly less than 1/4" wide. We can attempt to cut thinner pieces than this general rule of thumb allows, but the part will likely warp and be very fragile.

Text – Text should not have any fill only outlines in desired color for action

Inside Cuts – If you have an inside cut that you still need to be attached after the outside cut pass is finished you will have to use a tab system or some other kind of clever format. (i.e. when cutting out a lowercase letter e the inside half moon will no longer be attached. The “e” on the left will lose its inside form and the “e” on the right will preserve the side half moon because of the tab built in.)

_Files Designed in Rhino Laser Cut Template

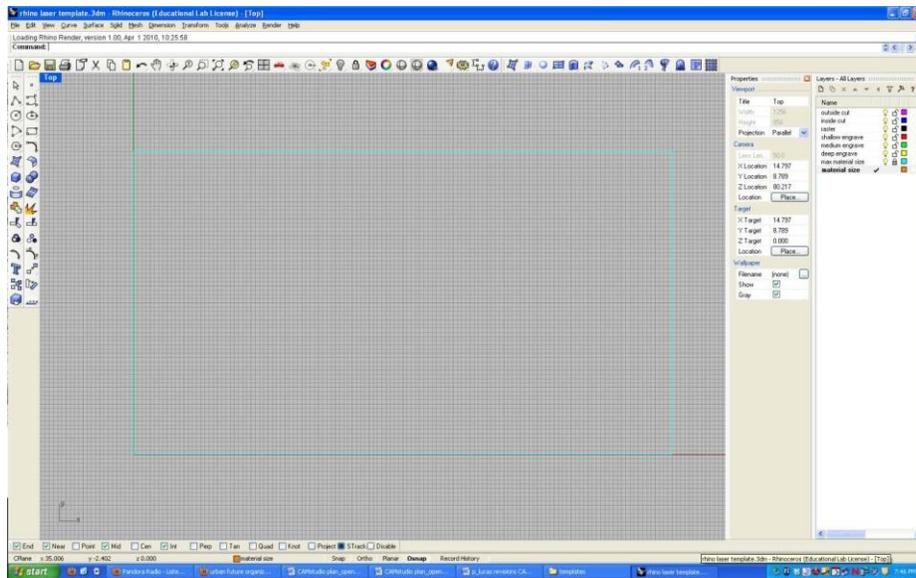
Cut Lines – All lines should be drawn on the ground plane, nothing floating in space will cut/engrave/raster. All files should have only paths and strokes with no fill colors. The only fill that should be on a file is black (raster). The laser cutter reads colors in order to print what you would like. Each color has a different action and listed in the layers toolbar. Your file should use the various layers that have been built into the template file to make sure that there are no color problems for the laser to read. The colors and action of those lines are as follows:

Outside cut lines – Magenta	Inside Cut lines – blue
Light engrave – red	Medium engrave – green
Deep engrave – yellow	Raster – black
Laser’s Cutting Bed Size – Cyan	Material Size– Orange

Note:

1. Black raster takes a long time = more money to print job on laser
2. Cyan – is used for page set up and outlines you may want for reference (i.e. 48”x24” laser bed).
3. Orange lines should be used to outline your material size (make sure all items you would like to cut/engrave/raster are inside that boundary.
4. The laser only cuts one line thickness. If you need a thicker line cut either draw two lines next to each other or choose to raster a rectangle (black fill)
5. All line work must be on the construction plane. No lines floating in space will be read by the laser printer.

Standard Layout Area – all files should be set up on the 48”w x 24” (cyan color) layer. Regardless of the actual size of your material (which is a good thing to first draw in Orange – so you can make sure your pieces fit).



All of your files should be set up in the upper left hand corner of the 48x24. This is your reference home (0,0) for the laser to orientate and reference your material size and cut file.

Be sure to leave at least 0.125" between adjacent parts in your layout (for materials thicker than 1/4", adjacent parts should be no closer together than the material thickness)

Below is a layout example:



Line sharing — When setting up a layout that includes line sharing (two parts right next to each other so that they share a single cut line), please be sure to delete any redundant copies of lines. If you have lines stacked on top of each other, though you might not be able to see them in your file, the laser cutter will see the paths and end up cutting twice along the same line, degrading the final part (and possibly causing melting, fire or warping).

Sharp corners — If you have any sharp corners, you might consider rounding them (called "adding a radius" to a corner, or "adding a fillet") so your parts will be less likely to crack around the corners. We can certainly cut your parts with sharp corners if you prefer. This radius can be very small (i.e. .05")

Adjust for kerf — You may want to adjust for the kerf (the thickness of the laser beam), which is about 0.01". (The laser centers itself on the lines you draw and takes off about 0.005" of material from either side of the lines.) For example, if you would like the hole in your part to have a diameter of roughly 1.0", you should draw a hole with a diameter of 0.99". If you would like a circular part with a diameter of about 3.0", draw a circle with a 3.01" diameter.

Small details — should be no smaller than material thickness. For example, if you are cutting a spider web pattern from 1/4" acrylic, the thin pieces of plastic that make up the web must be no thinner than 1/4" wide in your drawings. Note that the laser beam thickness will cause the final piece to have webs that are slightly less than 1/4" wide. We can attempt to cut thinner pieces than this general rule of thumb allows, but the part will likely warp and be very fragile.

Text — Text should not have any fill only outlines in desired color for action. The only hatch/fill that should ever appear in a drawing is black and that is the assigned hatch/fill color for raster.

Inside Cuts — If you have an inside cut that you still need to be attached after the outside cut pass is finished you will have to use a tab system or some other kind of cleaver format. (i.e. when cutting out a lowercase letter e the inside half moon will no longer be attached. The "e" on the left will lose its inside form and the "e" on the right will preserve the side half moon because of the tab built in.)

Fees

_ UNCG IARc / Art majors – No Charge

_ UNCG non- IARc / Art majors - .50 cents per minute + \$5.00 set up fee

_ UNCG IARc / Art faculty – .75 per minute + \$5.00 set up fee

***Note:** This printing/cutting process requires pre- and post processing for each project. Therefore, each time a different material is configured for cutting an additional set up fee will be added to the cost per minute.*

Makerbot 3D Printer

Project Scheduling

Students/users may sign-up for no more than two time slots each week for 3D printing. These time slots will be used for the CAM assistant to advise the student(s) on their file, give a cost estimate, and calculate the runtime. Each block of time is 30 minutes. 3D printing operation times are different from CAM's general hours of operation. Please see sign-up sheets outside of CAM, room 313, for times available. Students are welcome as walk-ins as long as no one is signed –up during the time slot. However, signing-up is the best way to guarantee a time. If a student is not on time for the appointment, they will need to reschedule. Also, if late or unprepared the time slot may be assigned to a student walk-in. If there is not a walk-in waiting, it is at the discretion of the lab assistant whether there is enough time to advise on the file within the student's original time slot. Students who have already signed up for two blocks of time in a week may gain additional time as a walk-in. Walk-in priority will be given to the prepared student who is there at the same time they are requesting. Walk-in appointments are only available during the 3D printing operation hours in which no student/user has signed up for a time slot.

The CAM lab assistant will provide the 3D printing request form and help with its completion. The file will then be reviewed by the assistant. Once your file has been processed, a CAM assistant will email you to notify you that it is ready for pickup. Files will be run based on a first come first serve basis and if time is available within CAM operational hours.

Cancel a time slot by notifying the CAM director no later than 8am on the day of the appointment. Continually missed, cancelled, or rescheduled appointments will result in loss of CAM privileges.

The sign-up sheet with 3D printing operational hours is posted outside of Room 313 in the Gatewood Studio Arts building. The 3D printing operational hours are different from CAM's general hours of operation.

Machine Materials

The material that is part of the CAM supplies for the printer is included in the cost of printing.

How to Submit a File

Students are to bring in a **.stl** or **.obj** of their project on a jump drive. Rhino allows students/users to save a project as an **.stl** file. The file will be transferred to the hard drive of CAM's computer. The student/user will fill out their portion of the Makerbot request sheet and turn it in to the lab assistant. Pricing will be calculated for the print service. Once the student/user confirms the job by signing the request form, the job will be submitted for processing. Jobs must be paid in full before they can be processed. A CAM assistant will email the student/user once the print is ready for pickup.

Rules/ Precautions

_The maximum build area is 9.9" x 7.8" x 5.9". This does not mean the student/user should print full-scale objects. In most cases it is appropriate to print scaled models of projects.

_All digital models need to have closed edges/surfaces. The “ShowEdges” command in Rhino will help identify any open edges/surfaces.

_Files that have “inverted normals” will not print. In this case, there is no digital 3D surface information detected in order for the job to print.

_If it is discovered in the digital preview that the object needs additional editing (ex: scaling the size, etc.), it is the student’s/user’s responsibility to correct the file and resubmit it for pricing.

_Lab assistants will assess the submitted model to determine the appropriate positioning of the object for printing. If your form requires an additional support for a successful print, it will be configured and added to the total cost of the print. If a student/user declines the recommend support they will be held responsible for any issues that occur in the model as a result of declining the recommendation.

_Objects printed with this process may crack and break if not handled properly.

_Models printed with the Makerbot experience some shrinkage. Therefore, they will not be at the exact scale they were digitally drawn.

_ If a digital file is set up improperly due to the student/user, the job will be stopped and the student/user will be charged for the project run time + set up fee and need to fix the file before it can be ran again.

_The maximum duration a file can print is 6 hours. Any project running beyond this time will need to be resized or reconfigured for multiple print jobs by the student/user in order for it to be processed.

Fees

_ UNCG IARc / Art majors - .05 cents per minute + \$3.00 set up fee

_ UNCG non- IARc / Art majors - .07 cents per minute + \$3.00 set up fee

_ UNCG IARc / Art faculty - .08 per minute + \$3.00 set up fee

Note: This printing process requires pre- and post processing for each object. Therefore, each object submitted for printing will be priced with a set up fee in addition to the cost per minute.

Vinyl Cutter

Project Scheduling

Students/users may sign-up for no more than two time slots each week for the vinyl cutter. Each block of time is 30 minutes. The vinyl cutter is very quick with cutting the material, so most students only need on time slot to cut one file. Students are welcome as walk-ins as long as no one is signed –up during the time slot. However, signing-up is the best way to guarantee a time. If a student is not on time for the

appointment, they will need to reschedule. Also, if late or unprepared the time slot may be assigned to a student walk-in. If there is not a walk-in waiting, it is at the discretion of the lab assistant whether there is enough time to running the file. Students who have already signed up for two blocks of time in a week may gain additional time as a walk-in. Walk-in priority will be given to the prepared student who is there at the same time they are requesting. Walk-in appointments are only available during the Vinyl Cutting operation hours in which no student/user has signed up for a time slot.

Cancel a time slot by notifying the CAM director no later than 8am on the day of the appointment. Continually missed, cancelled, or rescheduled appointments will result in loss of CAM privileges.

The sign-up sheet with vinyl cutting operational hours is posted outside of Room 313 in the Gatewood Studio Arts building. The vinyl cutter operational hours are different from CAM's general hours of operation and change from semester to semester.

Machine Materials

The cutting material and transfer tape that are part of the CAM supplies are included in the cost of cutting.

How to Submit a File

Students are to bring in an **.ai** or **.eps** file of their project on a jump drive, which has been prepared based on the *Rules/Precautions* listed below. Once the file is brought into CAM by the student/user, it will be transferred to the hard drive of CAM's computer and reviewed by the CAM Assistant. The student/user will fill out their portion of the Vinyl Cutting request sheet and turn it into the lab assistant. Vinyl cutting estimates will be given, but the final cost will be determined by the actual number of linear inches used from the vinyl roll once the job is printed + setup fee(s). Charges will be processed immediately after cutting.

Rules / Precautions

_Text which is 22 pt font or smaller is NOT recommended for this process due to the thinness of the lightweight and the ability for the excess to be removed (weeded out) which will jeopardize the craftsmanship of the final work.

_Only **.ai** or **.eps** files saved as Illustrator 8 or lower can be processed.

_The maximum width for printing is 21 inches. The length is determined during file creation by the student/user. Therefore, in order to cut the student / user must originally setup their art board at 21 inches wide.

_ All files must already have artwork converted to vector lines. These vector lines act as a path for the cutting blade to follow. Illustrator's outline option of the Image Trace and Expand tool help to converts images to vector lines, however in the majority of circumstances it is not appropriate for use due the "double line outline" it creates.

_If within a file a student/user has multiple 2D elements which are to be placed differently when transferred to a substrate, they should leave a minimum of 1" between the individual images for vinyl cutting. This is not required for any images being vinyl transferred as a group. This recommendation is to allow for easy transfer of the elements.

_ Student's/ users will be responsible for setting up their files according to the parameters listed above.

_Students/users should never walk into the designated vinyl cutting area when in operation or during cutting set-up.

_Once the job has printed, the student/user will be responsible for preparing the vinyl for transfer. This includes weeding out the vinyl cut and application of the transfer tape.

_Students/users should work together when picking up transfer tape for the project. Students/users should bring 1-2 accompanying students/user to help with the process.

_When applying the transfer tape, students/users must work on a surface that is clean and free of texture. Otherwise there is a high risk the transfer tape will not be applied properly.

_The student/user is required to stay the full duration of time it takes to run his/her vinyl cutting project.

_ If a digital file is created improperly by the student/user for the digital fabrication equipment, the job will be stopped and the student/user will be charged for the linear inches of cut vinyl + set up fee. The file will need to be fixed before it can be ran again.

Fees

_ UNCG IARc / Art majors - .75 cents per running linear inch of vinyl + \$3.00 set up fee

_ UNCG non- IARc / Art majors - \$1.00 per running linear inch + \$3.00 set up fee

_ UNCG IARc / Art faculty - \$1.25 per running linear inch + \$3.00 set up fee

Note: Each time a new file or vinyl roll is configured for cutting, an additional set up fee will be added to the cost per running linear inches.

Hot Press

Project Scheduling

Projects are scheduled on a first come first serve basis for students/users who have submitted all the mounting components based on the **Rules / Precautions** in this section of the Operations.

Student/user projects will be pressed based on their time of submission, the number of jobs in line for the service, and if time permits on the same day it was dropped off. CAM does not guarantee a specific day or time for the completion of the service. CAM will make every effort to have a student's/user's mounting completed within 24 hours. When UNCG is closed or out of session will also impact turnaround times.

Machine Materials

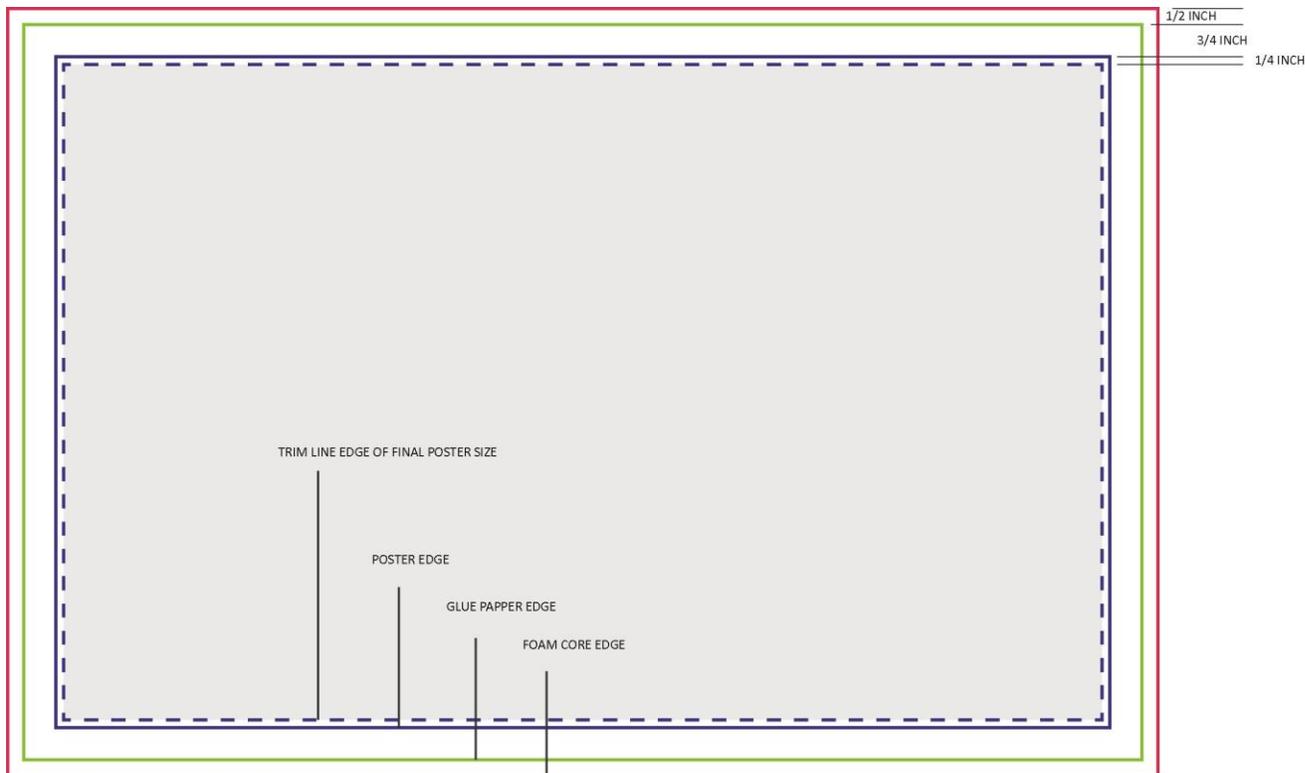
Student/user provides mounting board (foam core), poster, and cutting tools. The glue paper that is part of the CAM supplies is included in the cost of hot pressing.

How to Submit a Project

Students/users submit their posters with their pre-cut to size foam mounting board (based on the **Rules / Precautions** in this section of the Operations) and signed request form for the service to CAM in room 313 between the CAM hours of operation Monday-Friday. Unless verbally communicated, CAM will notify the student/user via email once their project is complete and ready for pickup. Projects will be available for pickup in CAM room 313.

Rules / Precautions

- _The type of material students/users supply as a mounting board is foam board.
- _ The maximum foam core size which can be pressed is 24" x 36".
- _For a successful mounting, students/user must trim their poster to its final size after it has been hot pressed.
- _Foam core, glue sheet, and poster with trim allowance must have a minimum of the following clearances for mounting.



_One glue sheet size 25 ½" x 37" is included with the service of each pressing service.

_After CAM has hot pressed the student's/user's poster it is his/her responsibility to trim the project to size.

Fees

_ UNCG IARc / Art majors - \$5.00 per 25 ½" x 37" sheet of glue paper + \$3.00 set up fee for each board

_ UNCG non- IARc / Art majors - \$8.00 per 25 ½" x 37" sheet of glue paper + \$3.00 set up fee for each board

_ UNCG IARc / Art faculty - \$8.00 per 25 ½" x 37" sheet of glue paper + \$3.00 set up fee for each board

Note: Each print submitted for mounting will be priced with the set-up fee in addition to the cost of the 25 ½" x 37" sheet of glue paper. One hot press board per request form.

Makerbot Digitizer 3D Scanner

Project Scheduling

Open for use by students/users on a first come basis during CAM hours of operation. Students/users must respectfully coordinate with each other when using the machines.

Machine Materials

Student/user provides objects for scanning and jump drive to save file(s).

How to Submit a File

No submission is required.

Rules / Precautions

_Turn the scanner on before opening the Digitizer program.

_The maximum scan size is 8" x 8" x 8".

_Follow the concurrent instructions that the program provides when setting up an object for scanning.

_Do not touch the scanner's camera filter or lens.

_Never stare or look directly into the area where the laser beam is emitted.

_Make sure the scanner is facing its designated wall and there are no obstructions in the camera's background.

_Never walk in front of the scanner when it is in operation.

_Never move the object while it is scanning.

_When receiving a “Scan Failed” prompt notify the CAM assistant.

_For additional information on the Makerbot Digitizer visit <http://store.makerbot.com/digitizer>

Fees

_ No charge

Next Engine 3D Scanner

Project Scheduling

Open for use by students/users on a first come basis during CAM hours of operation. Students/users must respectfully coordinate with each other when using the machines.

Machine Materials

Student/user provides objects for scanning and jump drive to save file(s).

How to Submit a File

No submission is required.

Rules / Precautions

_Use to scan medium to large objects.

_Turn the scanner on before opening the Next Engine program.

_Set the tripod base of the scanner to the appropriate height for the scan.

_Do not touch the scanner’s camera lens.

_Never stare or look directly into the area where the laser beam is emitted.

_Make sure the scanner is facing its designated wall and there are no obstructions in the camera’s background.

_Never walk in front of the scanner when it is scanning an object.

_Never move the object while it is scanning.

Fees

_ No charge

CNC Mill

Project Scheduling

Although the CNC is in the woodshop, the CNC is overseen by CAM. The primary contact for the CNC equipment is the CAM Digital Fabrication Director. The Woodshop supervisor works in coordination with the Digital Fabrication Director to schedule and process jobs. Students/users must contact the CAM director regarding questions for processing CNC jobs. A missed appointment may result in loss of CAM privileges. If a student is not on time for the appointment, he/she may need to reschedule. It is at the discretion of the CAM director whether the job is suitable for the machining process, and if there is enough time to run the file within the availability of time for processing.

Due to the amount of CAM assistant training required for operations, generally the earliest a job can be initiated in the FALL is the second week in September. Generally, the earliest a job can be initiated in the SPRING is the first week in February. A job which is initiated must first be reviewed before it can be processed.

Please contact the CAM Digital Fabrication Director for more information.

Note: All 3D cutting projects are recommended to have a job processed in foam prior to cutting the finish material. This allows for the design to be assessed based on the parameters of the CNC. Students/users opting out of this must cut at their own risk. The preliminary foam milling is the same CNC cost per minute plus a set-up fee.

For turnaround times of CNC projects, CAM considers several factors. First, when the job was scheduled to run, which is based on the availability of the student/user during the CNC hours of operation. Second, we take into account the length of time to process the job in relation to the CNC hours of available machine time. Third, file issues, equipment complications, and scheduling are other factors that may influence how time is scheduled for processing CNC projects.

Machine Materials

The approved materials for the CNC mill are acrylic, polystyrene, foam, plywood, OSB, soft woods, and hardwoods. MDF and other materials will be considered on a case-by-case basis. The student/user will need to contact the CAM digital fabrication director for approval. Also if not using an approved material, they must provide the appropriate bit(s) for processing the project. CAM is not responsible for any damage to bits owned by students/users during the processing of their project.

Certain projects may require test runs by the operator for the final job to be ran. Students/user must supply material for the tests. Charges may apply.

How to Submit a File

Students/user are to email their **.stl** file to the CAM digital fabrication director. Rhino allows students/users to save a project as a **.stl** file. The director will notify the student/user via email of when his/her project can be processed, the estimated cost, and any foreseen issues with the file.

All materials should be dropped off to the woodshop at least 2 hours before their runtime. This allows ample amount of time for file transfers and paperwork. Once the file has been transferred, it is the student's/user's responsibility to not leave their jump drive.

Rules/ Precautions

_A student's/user's project may require that he/she supply additional material to hold down their mill material to the bed of the CNC.

_Since the location of the CAM CNC is in the woodshop student's/ user's must have gone through the woodshop orientation for the semester.

_Proper safety and clothing attire must be followed based on the woodshop's guidelines.

_ If a digital file is set up improperly due to the student/user, the job will be stopped and the student/user will be charged for the project run time + set up fee and need to fix the file before it can be ran again. The student will have to fix his/her file, reschedule the appointment, and purchase more material.

_If it is discovered in the digital preview that the object needs additional editing (ex: scaling the size, grouping, etc.), it is the student's/user's responsibility to correct the file and resubmit it for pricing and scheduling at a later date.

_The student/user is required to stay the full duration of time it takes to run, test, and prepare their CNC project.

_The maximum amount of time for milling is 3 hours.

Fees

_ UNCG IARc / Art majors - .25 cents per minute + \$5.00 set up fee

_ UNCG non- IARc / Art majors – currently not available for these majors to process jobs

_ UNCG IARc / Art faculty - \$1.25 per minute + \$5.00 set up fee

***Note:** This cutting process requires pre- and post processing for each project. Therefore, each time a material is configured for cutting, additional set up fees will be added to the cost per minute. The maximum amount of time for milling is 3 hours. The minimum charge for the CNC is \$10.00.*

