a) Projection to the year 2025-26 of UCF's main-campus Student Credit Hours (SCH) generation by level.

Table 2.5(2) a) compares student credit hours (SCH) by level on the main campus of the University of Central Florida for the years 2014-15 and 2024-25. These represent credit hours generated in live sections (i.e., non-web) on the University's main campus only — not including Orlando-area off-campus sites, the Rosen College Campus, the downtown Expo Center, or the Lake Nona campus. On the other hand, the figures represent both fundable and non-fundable SCH combined.

TABLE 2.5(2) a)—Projected Student Credit Hours					
Main Campus Summary	Lower	Upper	Grad 1	Thesis/Dis.	Total
2014-2015	363,239	450.931	55,243	27,677	897,091
2024-2025	422,041	444,335	61,700	32,116	960.191

Having said that, we must recognize that for campus planning such enrollment projections are subject to significant uncertainty. Experience over the past decade indicates that projections for UCF tend to be consistently on the low side, even in the short run, let alone several years out.

There are a number of reasons for this, which do not seem likely to change much over the decade in question. They include: ongoing growth of the state population, much of which is concentrated in central Florida, especially the I-4 high-tech corridor from Tampa through Orlando to the space coast; dramatic overall growth of Florida's college-age population, ranging from mid-to-late teens through the late twenties, much of it concentrated in Central Florida; UCF's increasing "market share" among Florida's college-bound students, compared to that of other universities in the State University System; and the relatively new and still growing emphasis at UCF on graduate studies, especially at the doctoral level.

In short, our belief is that UCF's official enrollment projections should be viewed as a lower limit on what the true figures may be, rather than a close estimate of likely figures. In specific terms we anticipate that enrollments by 2020-21 may be 5% to 10% higher than those projected now — and consequently it is imperative to cover such a possibility with current planning.

With reference to needs for academic facilities, we estimate that to serve an added 1000 FTE students annually will require added classrooms amounting to about 7,600 square feet per year — or equivalently 500 classroom seats per year. This conclusion can be reached by various lines of argument, the simplest of which is based on overall numbers of classrooms and students.

On the main campus, for example, according to 2008-09 inventory figures the University used about 198 thousand square feet of space for "classrooms" (however see the next paragraph below). At that time on the main campus the student FTE total was around 26 thousand. This works out to an average of about 7.6 square feet per student, which translates into the quoted figure of 7,600 square feet per 1,000 students.

Efficiency of Classroom Usage   At present it seems clear that where classrooms are concerned, UCF's main campus is operating "well above capacity." This is made possible by requiring the routine usage of regular academic buildings throughout a weekly schedule that is nearly 70% greater than what the official SUS space formula calls for (i.e., 69 hours per week here, versus the official 40 hours per week). In addition we have a certain amount of classroom usage in areas designed originally for other purposes (laboratories, theaters, library study areas, and so on).

To put the existing use of facilities in better perspective, one can note that UCF's fall semester figures for weekly hours of usage involving general-purpose classrooms show that our *average* use per classroom is typically well over 50 hours per week. This naturally is concentrated in the high-demand Monday through Friday morning and afternoon periods — so during this five-day portion of the week, the average overall classroom usage exceeds ten hours per day.

Planned Classrooms in Relation to Needs One clear implication of what has been said is that not much relief from shortages can be found via attempts to increase the efficiency of existing classroom usage. On the contrary, the University's classrooms are already used essentially to their maximum capacity, as a result of which the UCF weekly average usage figures are among the highest in the SUS. With the above facts in mind, some attempt has been made to assess the adequacy of classroom space that is apt to come on line over the next decade. A perhaps overly hopeful conclusion is that planned new construction will be able to accommodate the assumed new students at current efficiencies of usage. This of course assumes that PECO funds for new construction will be somewhere near adequate to support the existing plans.

Teaching Laboratories Turning from general-purpose classrooms to teaching labs, one finds an enrollment-related problem there also. In terms of the currently existing spaces, teaching labs represent roughly three quarters as much total square footage as classrooms. At face value this seems not unreasonable, given that weekly hours of lab usage per student are less on the average than those for classrooms—almost exactly five times less, according to typical data. On the other side of the picture is the fact that square footage per lab seat is typically about twice that per classroom seat, say 30-35 sq.ft., compared to 15-17 sq.ft.

One overall implication might seem to be that while enrollment growth does lead to a need for more teaching labs, this does not rise as steeply as the need for classrooms, at least when couched in terms of square footage per added FTE student (two and one half times less) or seats per added FTE student (five times

less). On the other hand, the "efficiency" of laboratory usage in terms of total hours per week is ordinarily a good deal smaller than that for classrooms — which is one main reason why at present, overall square footages of labs and classrooms are more or less comparable, with the total for labs being actually somewhat greater.

The same result is also reflected in SUS formula results for NASF needs by space type, which show that in every case —which is to say, for all the individual SUS universities, excluding only New College of Florida — the NASF needs per overall FTE student are somewhat greater for labs than for classrooms, with the lab excess need ranging from 3% for UWF to 70% for FSU. In this regard, we must emphasize that these results are based on the traditional SUS space formula parameters — which were last updated about fifteen years ago, in the early '90's of the last century. At that time UCF's lab to classroom ratio of NASF per student showed an excess of about 13% for labs.

More recently however, we at UCF have succeeded in updating all of the system-wide formula parameters for each space type — and by that means, we found among other things that UCF's lab to classroom formula ratio of NASF per student FTE has risen to 23%. The reason for this change is simply that in the 15-year interim, the university experienced relatively greater growth in disciplines with high needs for labs as opposed to classrooms, compared to what the SUS-wide averages might suggest.

In any case, this also means that more flexibility remains in principle for increasing the weekly hours of lab usage, if future enrollments made it necessary. To put what is essentially the same point in different terms, there is some possibility of scheduling added sections in existing laboratories, and this persists (at least from the simplistic standpoint of "free hours" in the schedule), long past the point when general purpose classrooms are utilized to the maximum extent feasible.

Research Laboratories In general the needs for added research laboratories are not coupled as closely to enrollment growth as those for classrooms and teaching labs — but nonetheless there is some relation to enrollments. First, with growth comes the need for added faculty — and it goes without saying that in the laboratory sciences, engineering, studio arts, and similar disciplines, new faculty in many cases have needs for their own dedicated labs to support scholarship and other required professional development activities.

Secondly, research labs are essential for thesis and dissertation work by students in disciplines with active graduate programs, especially the sciences and engineering. To that degree the distinction between research labs and teaching labs breaks down somewhat, inasmuch as instructional functions are intrinsic to both. The difference is one of degree, not of kind. Besides, many cases currently exist on campus where one and the same lab is used both for graduate coursework and thesis and/or dissertation work, not to mention faculty research as such.

Finally, enrollment growth often comes about not simply from increasing numbers of students in ongoing programs but from attracting students to wholly new programs. Some of them bring distinctive laboratory needs that simply are not met by previously existing types of facilities.

Good examples are furnished by the university's strong push in recent years toward excellence in key areas such as advanced materials processing and analysis (particularly in regard to "I-4 High Tech Corridor" partnership activities), biomolecular sciences, and most recently nanosciences. Such developments can only accelerate as the university continues moving toward its strategic goal of achieving national and international prominence in selected areas of research and scholarship.

One final point regarding research labs is that both current and projected UCF needs for this type of space are much greater than what might be inferred from the existing SUS space formula mentioned earlier (see discussion above regarding teaching lab space). That formula as it stands would suggest that as of 2008-09, based on its main-campus enrollment of 25 thousand FTE, UCF's research lab needs would come to about 350 thousand NASF (which is to say, based on the traditional figure for such space of 13.87 NASF per FTE).

On the other hand, this result is based on formula parameters fifteen years out-of-date, going back to a time — say, 1993-94 — when the University's total research funding was not yet $40 million. By now this has increased to about $140 million, so the formula need for research labs has increased to 22.68 NASF per FTE. Accordingly, total research labs needed in 2008-09, based on the updated formula, are over 560 thousand NASF.

By the same token, if projected forward to the years 2020-21, the figures for research lab needs become 630 thousand NASF.

Offices. While offices are not viewed strictly speaking as "academic spaces," mention of them is made here for two reasons. First, UCF's continued growth of enrollments over the coming decade will require additional regular faculty and staff, who cannot function properly without added office space. Thus offices for the regular instructional faculty are a necessary adjunct to the added classrooms and labs that will be needed.

Secondly, with reference to the projected main-campus office needs (as opposed to shortages), we estimate that by 2010-11, based on projected enrollments, these will approach 650 thousand square feet. By the same token, if actual enrollments were to exceed projections by 10%, office needs would approach 700 thousand square feet. To be sure, one must add that these figures represent aggregates of all "office-type" needs for the entire campus—not only faculty and staff offices *per se* in both academic and administrative units, but also related spaces such as conference rooms and "office support" areas, e.g., supply closets.

Study Spaces. Another sort of space to be kept in mind is titled "Study." This is mostly but not entirely accounted for via the University Library. In that regard, we note that Instructional Space-Use Standards for libraries include, besides the usual stack areas for books and journals, reading rooms and study carrels.

While as we have remarked the latter are classified as Study space, additional study areas occur in scattered buildings across the campus — especially now that "computer study rooms" are becoming more widespread. At this point roughly 25% of main campus study areas are outside the Library, and the fraction may increase with the passage of time.

Table 2.5(2)d) shows the projections of future needs for instructional, research, and study spaces in terms of Net Assignable Square Footage (NASF).

TABLE 2.5(2) d)—Projection of Future Space Needs: Net Assignable Square Footage (NASF)		
Space Type		Year 2020-21
Classroom		325,144
Teaching Laboratory		400,387
Research Laboratory		627,612
Office (including Conference)		670,705
Study (including Library)		358,247
Total		2,382,094

A projection of future academic gross building area needs (tabular). The gross building area necessary to meet growth demands has been projected for the five year planning period. Table 2.5(2)e) indicates the amount of gross square feet (GSF) required to satisfy the demand for space in the five categories listed. The GSF projections are a result of increasing the assignable square footage for each category by a 1.5 multiplier.

TABLE 2.5(2) e)—Projection Of Future Space Needs: Gross Square Footage (GSF)		
Space Type		Year 2020-21
Classroom		487,715
Teaching Laboratory		600,581
Research Laboratory		941,418
Office (including Conference)		1,006,057
Study (including Library)		537,371
Total		3,573,141

f) Analysis of future net and gross building area requirements into building "increments." N.B.: The basis for this analysis shall be fully described and shall be based on considerations of funding, prototypical building sizes, or other logical

and replicable method of calculation. The analysis should also consider whether future new space needs would be best accomplished through renovations or additions to existing facilities.

University campuses typically are made up of buildings housing a wide range of uses. At the University of Central Florida many buildings accommodate varying proportions of academic, study, and support space within a single structure. Thus, interpreting future net and gross building area requirements in terms of building increments can be misleading, since it is unlikely that all of the future academic facilities will be accommodated in single-use buildings. It is more likely that new academic facilities will be integrated across the campus in a diverse range of building types.

Moreover, logical figures for building increments will be determined as much by site planning and urban design parameters as by specific programmatic elements. In any case, if we assume for simplicity that typical new campus buildings will be no more than 100 feet in width, five stories in height, and 300 feet in length, then each one will be able to accommodate at most 150,000 gross square feet of space.

Accordingly, assuming a gross to net square footage ratio of 1.5, one finds that the net assignable square footage per building will be 100,000 NASF—in which case the total number needed to achieve an overall increase of 800,000 NASF (i.e., from the current 1.58 million NASF to a projected 2.38 million NASF) will be eight new buildings. (Of course if the average dimensions per building turn out to be smaller, then the number of buildings required will be larger.)

[AA1]