**FORMULARIO DE LA ASIGNATURA AMPLIACIÓN DE MATEMÁTICAS**
**Ingeniería Técnica en Topografía**

## Tema II: Trigonometría Esférica

*Teorema del coseno para los lados*

$$\begin{aligned}\cos a &= \cos b \cos c + \operatorname{sen} b \operatorname{sen} c \cos A\\ \cos b &= \cos a \cos c + \operatorname{sen} a \operatorname{sen} c \cos B\\ \cos c &= \cos a \cos b + \operatorname{sen} a \operatorname{sen} b \cos C\end{aligned}$$

*Teorema del coseno para los ángulos*

$$\begin{aligned}\cos A &= -\cos B \cos C + \operatorname{sen} B \operatorname{sen} C \cos a\\ \cos B &= -\cos A \cos C + \operatorname{sen} A \operatorname{sen} C \cos b\\ \cos C &= -\cos A \cos B + \operatorname{sen} A \operatorname{sen} B \cos c\end{aligned}$$

*Teorema del seno*

$$\frac{\operatorname{sen} a}{\operatorname{sen} A} = \frac{\operatorname{sen} b}{\operatorname{sen} B} = \frac{\operatorname{sen} c}{\operatorname{sen} C}$$

*Teorema de la cotangente*

$$\begin{aligned}\operatorname{cotg} a \operatorname{sen} b &= \cos b \cos C + \operatorname{sen} C \operatorname{cotg} A\\ \operatorname{cotg} b \operatorname{sen} c &= \cos c \cos A + \operatorname{sen} A \operatorname{cotg} B\\ \operatorname{cotg} c \operatorname{sen} a &= \cos a \cos B + \operatorname{sen} B \operatorname{cotg} C\\ \operatorname{cotg} b \operatorname{sen} a &= \cos a \cos C + \operatorname{sen} C \operatorname{cotg} B\\ \operatorname{cotg} c \operatorname{sen} b &= \cos b \cos A + \operatorname{sen} A \operatorname{cotg} C\\ \operatorname{cotg} a \operatorname{sen} c &= \cos c \cos B + \operatorname{sen} B \operatorname{cotg} A\end{aligned}$$

*Analogías de Neper*

$$\frac{\operatorname{tg}\left(\frac{A+B}{2}\right)}{\operatorname{cotg}\left(\frac{C}{2}\right)} = \frac{\cos\left(\frac{a-b}{2}\right)}{\cos\left(\frac{a+b}{2}\right)}, \qquad \frac{\operatorname{tg}\left(\frac{a+b}{2}\right)}{\operatorname{cotg}\left(\frac{c}{2}\right)} = \frac{\cos\left(\frac{A-B}{2}\right)}{\cos\left(\frac{A+B}{2}\right)},$$

$$\frac{\operatorname{tg}\left(\frac{A-B}{2}\right)}{\operatorname{cotg}\left(\frac{C}{2}\right)} = \frac{\operatorname{sen}\left(\frac{a-b}{2}\right)}{\operatorname{sen}\left(\frac{a+b}{2}\right)}, \qquad \frac{\operatorname{tg}\left(\frac{a-b}{2}\right)}{\operatorname{cotg}\left(\frac{c}{2}\right)} = \frac{\operatorname{sen}\left(\frac{A-B}{2}\right)}{\operatorname{sen}\left(\frac{A+B}{2}\right)}.$$